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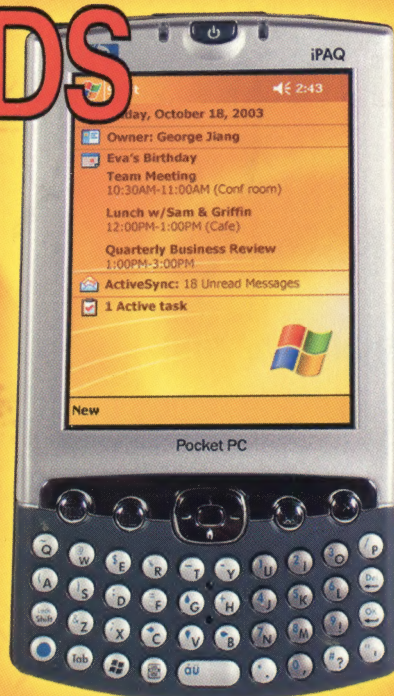
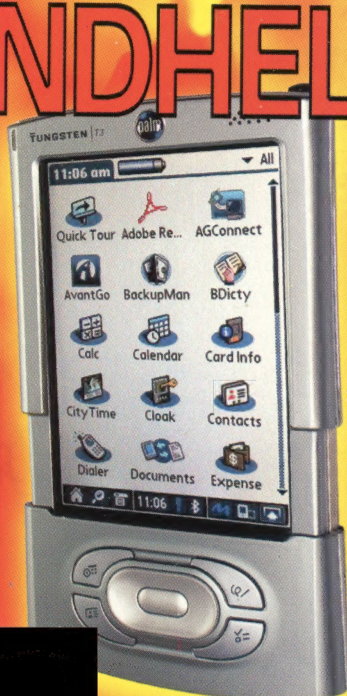
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- SAMSUNG i500
- HITACHI G1000
- TDS RECON
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- TOUGHBOOK CF73
- SONY NX80V

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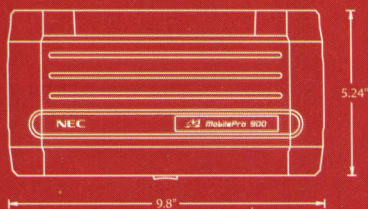
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“A week with the Hitachi G1000 Pocket PC/cellphone brought back the questions the industry has been grappling with for a decade: Do phones need PDA functionality? Do PDAs need to also be a phone?”

— See G1000 review, page 74

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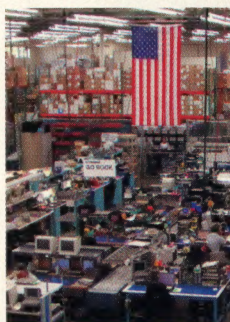
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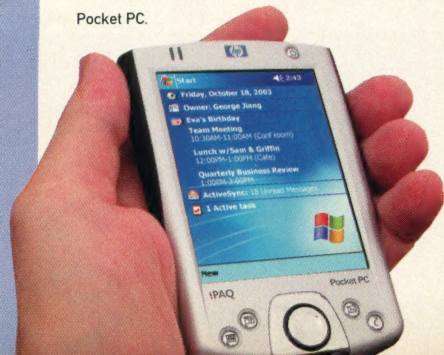
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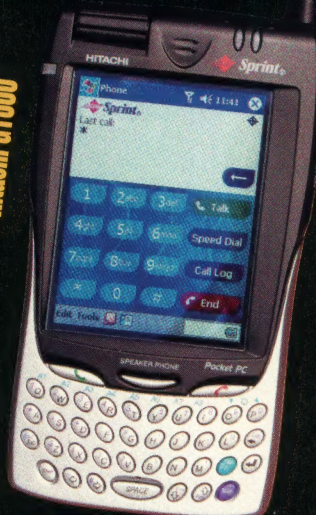
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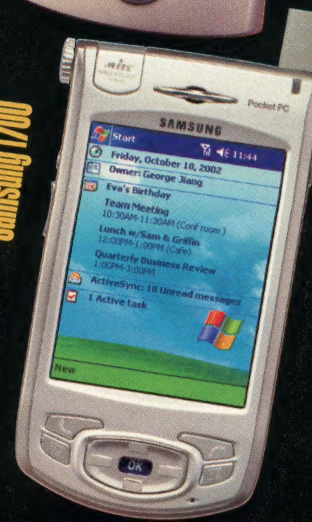
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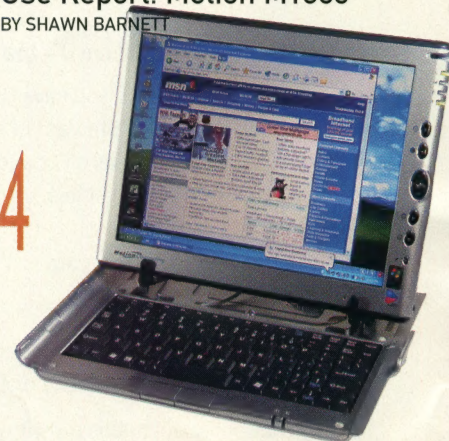
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TOOLBOX

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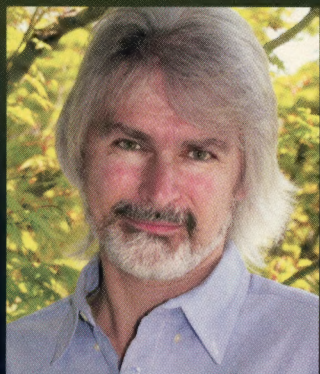
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CONRAD BLICKENSTORFER

When we founded Pen Computing ten years ago everyone thought we were crazy to start a magazine in what was seen as a thoroughly discredited field. How times have changed.

What you're holding in your hands is the 50th issue of *Pen Computing Magazine*, the latest in almost ten years' worth of reviews, opinions, contemplations and news on leading edge technology and alternate input methods. That warrants a brief look back over how it all happened.

When we had the dubious idea of launching a magazine dedicated to pen computing back in 1993, most industry insiders laughed at us and predicted failure even before our first issue. After all, at that point pen computing was ridiculed and scorned as a discredited technology, one that had been long on hype and short on substance. From today's vantage point, with tens of millions of PDAs and Pocket PCs out there, and with Microsoft heavily banking on the Tablet PC and digital ink, it's hard to believe that just a decade ago pen computing was considered dead. Here's how it happened.

Why pen computing in the first place? Because a lot of people don't feel comfortable with keyboards. They would rather use something familiar like pen and paper. And because keyboards are bulky and not always convenient to use. In fact, legend has it that when Remington and Sons created the first commercial typewriter in the 1870s, they specifically placed common letters in hard to reach places to slow typists down so that the elaborate machinery didn't jam quite as often. Whether that's true or not, no one really knows. The QWERTY keyboard layout certainly isn't optimal, but we're stuck with it, and people get used to everything.

Those shortcomings notwithstanding, the idea of using something other than a keyboard to enter data into a machine has been around for a long time. A patent for the recognition of handwritten numbers to control machines was filed in the US back in 1914. Another patent for machine recognition of handwriting was filed in 1938. The RAND corporation developed digitizing tablets for handwriting recognition in 1956

and had a character recognizer similar to Graffiti in 1966. In 1968, Dr. Alan Kay described his vision of a notebook tablet computer that he called the "Dynabook." The Dynabook, Kay said, was going to be a "dynamic medium for creative thought, capable of synthesizing all media—pictures, animation, sound and text—through the intimacy and responsiveness of the personal computer." The name "Dynabook" was later appropriated by Toshiba which sold its early pen tablets as "Dynapads." The 1980s saw the emergence of a number of handwriting recognition companies. In 1987, Apple Computer unveiled the "Knowledge Navigator," a concept computer that opened like a book, had speech recognition, built-in camera, wireless communication, and intelligent information retrieval. Apple commissioned a terrific video that showed how it all would work.

The history of personal pen computing products begins in 1989 when Iranian entrepreneur Kamran Elahian founded Momenta. Momenta built a 386/20 based pen tablet that looks very much like some of the latest Tablet PC slates. However, too much hype resulted in unrealistic expectations and Momenta would shut down in 1992 after having burned through \$40 million in venture capital. This did not keep others from trying. Jeff Hawkins, who would go on to invent the Palm Pilot and start Handspring, designed a series of pen computers, including a pen convertible, at GRiD. By 1991, despite Momenta's problems, the pen computing hype was coming to a fever pitch. GO Corporation developed PenPoint, an entirely new operating environment designed around the pen. EO was spun off from GO to build PenPoint pen computers. While early GRiD machines ran PenDOS, a version of DOS that supported pen input, Microsoft worked on Windows for Pen Computing and engaged in a fierce competition with GO's PenPoint. In 1992 things came to a head. GO

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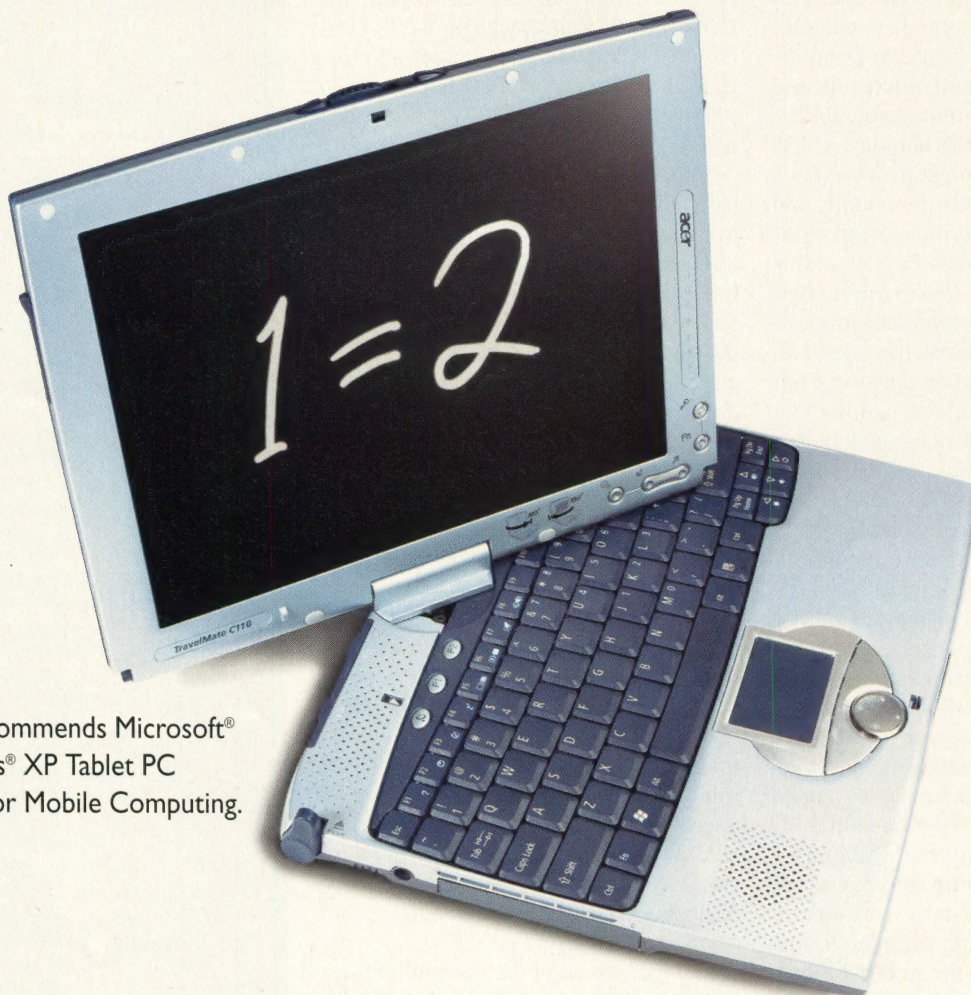
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Empowering People

released PenPoint. Microsoft released Windows for Pen Computing. Momenta unveiled its own user interface. Lexicus and others released handwriting recognition engines. In 1992 and 1993 EO, NCR, Samsung, Dauphin, IBM, Fujitsu, Toshiba and others released pen tablets that looked remarkably similar to the Tablet PC pen slates of today. A 1993 Fujitsu 325Point, for example, measured 11.7 x 8.7 x 1.2 inches, weighed three pounds, and sold for US\$1,695, roughly the same as a contemporary tablet from HP, Fujitsu or Motion. On the other hand, those early models were saddled with dim monochrome displays, slow processors, weak batteries, and minuscule memory and hard drives. That and a general disillusion with handwriting recognition and the lack of compelling applications caused the bubble to burst in 1993. Momenta closed its doors, Samsung gave up after the PenMaster, NCR dropped out, GRiD was sold to AST and liquidated, Dauphin and EO went bankrupt, and Compaq, IBM, NEC and Toshiba all stopped their pen projects.

After 1994, pen computers retreated to vertical markets and became essentially unavailable to consumers. Microsoft, having defeated the PenPoint initiative, lost interest. The company went on to offer Pen Service 2.0 for Windows 95, but it was a half-hearted effort and not very successful.

So that was the environment *Pen Computing Magazine* was born into. We came onto the scene just as the party was over and all the instant pen computing experts and champions had left for the next big thing. Pen computing was almost a dirty word. At trade shows there were all but a handful of pen technology products, and those usually by obscure companies for very specialized markets. We catalogued all of those products and reviewed as many as we could for those who were still interested in the field.

Fortunately, a second branch of pen computing products was just emerging, PDAs. Apple's Newton MessagePad created a lot of excitement, and there were a number of other early PDAs based on the GEOS and Magic Cap environments. Once again, handwriting recognition (or the lack of it) proved to be an Achilles heel for an otherwise promising platform, but we still loved the Newton which quickly developed into a terrifically useful device. The MP110, MP120, MP130, and then the magnificent MP2000 and 2100 followed the original 1993 Newton MessagePad in its all too brief tenure that ended in 1998 when Steve Jobs regained the reins at Apple and pulled the plug. But the Newton was not alone. After his early pen computing work at GRiD, Jeff Hawkins originated the Casio Z-7000/Tandy Zoomer PDA and then went on to revolutionize the industry with the Palm Pilot. Motorola gave some fascinating early views at wireless com-

municators with the 1994 Envoy and Marco products, both way ahead of their time. HP tried to build on their success with tiny DOS-based handhelds with the GEOS-based OmniGo clamshell that converted into a Graffiti-driven tablet, but failed. Sharp got into the act in 1995 with a PDA that wasn't a PDA, the ill-fated keyboard-based Zaurus.

1996 saw both the Palm Pilot and the introduction of Windows CE. While the little Microsoft clamshells were mostly failures, the Palm Pilot took off like a rocket. In early 1998, Microsoft introduced its own Palm-style platform and called it Palm PC. That did not sit well with Palm who enlisted legal aid. Microsoft changed the name to the awkward "Palm-size PC" and eventually the much better "Pocket PC."

The last few years of the 20th century were thus a curious scene of specialized pen computers trying to eke out low volume sales in various vertical markets, and a number of PDA platforms battling for supremacy, or at least getting the consumer's attention. In many respects, those were the glory years of *Pen Computing Magazine*. 9/11 and the dotcom crash were yet in an unimaginable future, and no other publisher would touch our field with a ten foot pole. Palm ruled supreme in the PDA market, selling tens of millions of unassuming little handhelds, with Microsoft looking on and tenaciously trying to find its own successful formula, which eventually arrived, to some extent, in the Pocket PC.

The early years of the new millennium were grim. Terrorist attacks, a jittery economy, the dotcom crash, loss of faith in technology companies. Yet, good ideas don't go away and none other than Microsoft itself unexpectedly picked up the pen computing banner once again with the announcement of the Tablet PC initiative in 2001. Regardless of whether it was the sheer merit of the pen and paper metaphor, Bill Gates' personal interest in tablets, or just an effort to bring some excitement into the increasingly boring and generic world of PCs, the arrival of the Tablet PC brought pen computing back into the mainstream. Whether it will stay there is still anyone's guess. Hardware technology is now advanced enough to make tablets feasible, but pen and ink-centric software suffers from a decade of neglect. Most of those technologies essentially remain at mid-1990s levels and there's a lot of catching up to do. As a result, there isn't as of yet a Tablet PC "killer application" and without that it's difficult to create excitement and sales.

So ten years later, *Pen Computing* finds itself right in the thick of things. But where once we were the lone voice in the wilderness, now almost every PC mag proclaims itself an instant pen computing expert. ▀

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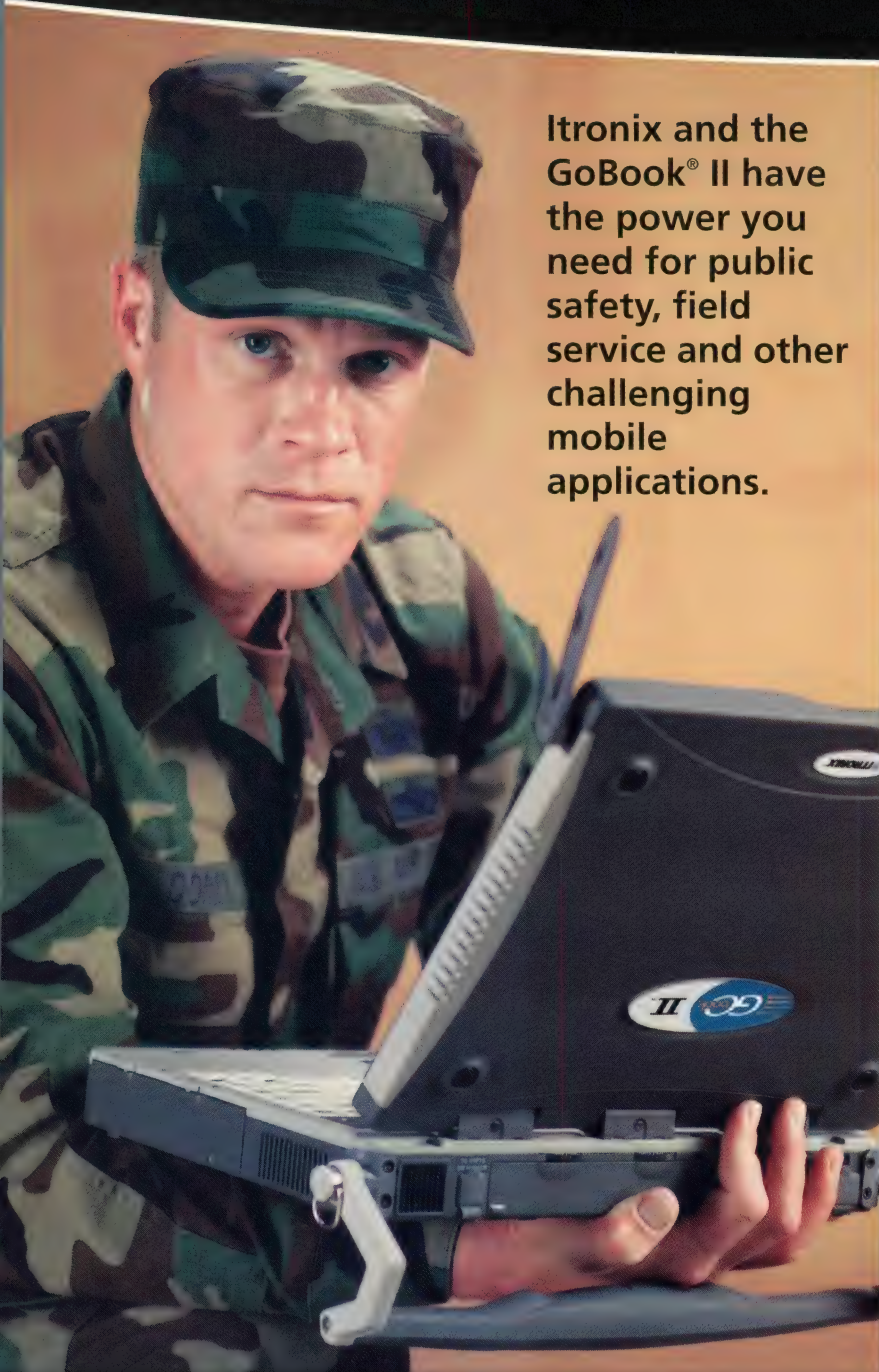
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SCOTTeVEST 3.0

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A couple of years ago, before they were worn by Playmates and presidents (George W. Bush reportedly wears one), Scott Jordan sent me his first SCOTTeVEST prototype. In the detailed discussions that followed, I realized his vision of technology-enabling outer garments made loads of sense. As someone who has been struggling to find attractive, durable carrying solutions for personal electronics for almost twenty years, Scott's idea intrigued me. What if I could simply wear all my stuff, instead of strapping it over my shoulders or burdening my pockets?

That first design resembled nothing more than a black photojournalist's vest, partially turned inside out. Most of the pockets were inside and out of sight, with connecting passages threaded between them for cords of various kinds. It was a bold stroke, but the bulging pockets made it look overly masculine so it appealed mostly to diehard geeks. Version 2.0 made substantial improvements in the elegance department, with clean lines, better integration, nicer materials, and a built-in backpack/pocket.

Now we have SCOTTeVEST 3.0, a complete redesign incorporating the best of the previous revs with increased overall outdoor utility — and still it manages to look sleek on the body.

The 3.0 is available in all-weather materials including FineTex for the outer wind-and-waterproof shell, breathable CoolMax for the interior lining, and a lightweight fleece version that can be optionally zipped into the shell for maximum protection from inclement weather. Altogether, it is far more than an all-season jacket, it's an outerwear system. From lightweight summer vest to warm winter parka, the SCOTTeVEST 3.0 does it all.

Nice Touches

You might think that 42 pockets and compartments with interconnected wiring conduits would be enough to have your average techno-maven clicking the Buy button as fast his mouse can move, but the real intelligence of this new design is in the little things. Nice touches abound. Starting at the top, there's a removable CoolMax-lined hood that has a fleece-lined collar with conduits for headphone cords to keep them off your neck. There are pairs of earbud headphone retainers on either side of the neck so you can al-

ways pop them in or out without fumbling around. Travelers and law enforcement officials will love the hidden, upper-right breast pocket that reveals a flip-out badge or ID holder. Hidden epaulets on each shoulder are handy for clipping a mobile phone, cop-style, for easy speakerphone use when your hands are full. The inside breast pocket contains a cord with a clipped eyeglass chamois. Subtle piping on the front pockets add a bit of welcome detail which is echoed on the hand warmer pockets below. These pockets have key or security card lanyards, and the left pocket can be segregated into two pockets with an internal zipper and, on one side, a pair of beverage straps. There are two waist cinchers to keep out the wind, and a handy hat clip in back. On the middle back there is a large outside compartment that's big enough to carry a laptop.

I'm sure there are more cool features to this remarkable design, but I haven't discovered them yet. I'll find them eventually, though, since I bought one of my own.

If you tend to carry two or more electronic devices with you at all times, take a long look at the new SCOTTeVEST 3.0. It's a uniquely useful and attractive article of outerwear that will quickly become essential to you, all year-round.

—David MacNeill, Editor-at-Large

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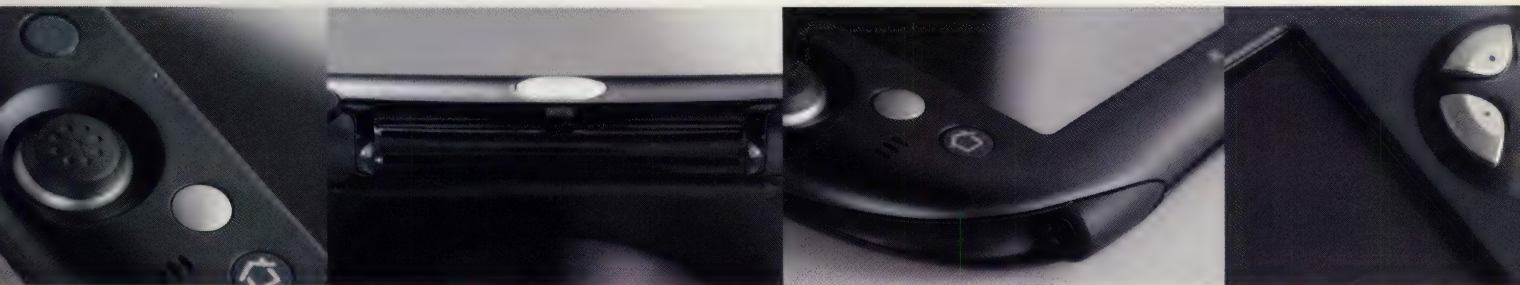
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HOT STUFF

Tapwave's Zodiac mobile entertainment console ROCKS

by David MacNeill, editor-at-large

Every few years, a device comes along that defies easy categorization. The people who are paid to market such devices have to work twice as hard, since they must not only sell the machine, but also position it in a previously uninhabited niche of our collective minds.

Tapwave's new Zodiac is such a device. Envisioned as a console-class portable gaming platform as well as a state-of-the-art Palm-powered PDA, its designers have achieved something remarkable: the Zodiac does both things well — very well.

The game market is huge — bigger than the movie industry, in fact — and an increasing share of that lucre is going into mobile devices. Tapwave's Zodiac, along with Nintendo's GameBoy Advance, Nokia's N-Gage, and Sony's forthcoming PlayStation Portable, are all positioned to go after the upscale game device market. In the case of the Zodiac, the audience is clearly not just teenage boys, but the teenage boy in people of all ages who have US\$300-\$400 to spend on a whim. This demographic consists mostly of people like me and, since you are reading *Pen Computing*, you too. We have had a number of PDAs and use them every day of our lives. We grew up on computer games and never wholly lost our appetite for playing them — we just have less time to play them than we used to.

And that is the whole point. Mobile technology allows us to use the "lost" time in our busy lives. What Tapwave wants you to do is play some killer game or watch a movie while you wait in line. If you simply must catch up on your e-mail or update your task list, then you can do that: it's a world-class Palm organizer, too.

Sounds pretty good, doesn't it? It is. I've been doing this for a week and I'm hooked.

Business in the front, party in the back

The Zodiac is a singularly attractive machine, with sloping, hand-friendly curves and subtle detailing. It looks nothing like any game machine you've ever seen. In muted grey and black anodized aluminum, Zodiac look right at home in a meeting room full of suits; just don't forget to mute the thing before you launch *Spy Hunter*. It would have been funny if the codename for this device was Mullet, the quaint 70's haircut that is "business in the front, party in the back".

As a workaday PDA, the Zodiac is equaled only by the high-end Sony CLIE models that cost twice as much as the Zodiac. The Zodiac 1 and 2 have a 200MHz Motorola iMX1 ARM9 processor, Palm OS 5.2T, a gorgeous 3.8-inch transreflective (indoor/outdoor) display with 480x320 resolution, an SD card slot, an SD/SDIO card slot, Yamaha stereo circuitry and speakers, high quality earphones, Bluetooth wireless, a 1540mAh lithium-ion battery, and an ATI Imageon W4200 graphics chipset with 8MB of video RAM. The slate grey Zodiac 1 (US\$299 direct) comes with 32MB of memory, while the charcoal grey Zodiac 2 (US\$399 direct) — the model I reviewed — has a whop-



zodiac





ping 128MB. All this in a shirt pocket-size package weighing a mere 6.3 ounces.

On the software side, Tapwave builds in a very well designed MP3 player that sounds nearly as good as my iPod, a digital photo viewer that's as good or better than anything I've tried, Kinoma Player for 30 frame-per-second full-screen movies, a web browser, PalmReader for viewing e-books, an alarm clock application that lets you select your favorite MP3 file to wake you, a graphing calculator, and the excellent WordSmith for creating and reading Microsoft Word-compatible text documents. They also bundle two games on the CD: Stunt Car Extreme and Acid Solitaire, as well as Kinoma Producer for converting virtually any video file into a handheld-friendly format.

Such a wealth of diverse applications deserves a powerful user interface, and Tapwave delivers one. The Zodiac UI improves on Sony's latest jog-wheel interface with greater simplicity, customization, and speed. Using the analog joystick controller, you can select any program or preference pane with one or two thumb movements. Tapwave has created the most attractive and sensible user interface I have seen since Newtons walked the Earth.

Get sideways

The Zodiac is made for either traditional portrait or the more interesting landscape orientation. There is a slim, movable sidebar with buttons to rotate the display, bring up the menus, take you to the app launcher, and to slide out the Graffiti 2 input area as needed. All the standard Palm OS PIM apps run full screen either way, but when older Palm OS 5-compatible applications are run in landscape mode, they appear in a 320x320 center window with black bars on either side. While I'm on the subject, my Zodiac ran every app I threw at it without a hiccup. If your favorite app from the more than 19,000 current titles for Palm OS runs on OS 5, it'll almost certainly run on a Zodiac.



This device is clearly meant to be used horizontally. It fits better in your hand and the controls are easier to operate. There are two, flush-mounted trigger buttons on the device's shoulders that are constantly being clicked when the machine is held vertically. They don't do anything when you aren't playing a game, but I find it a bit annoying so I use the Zodiac almost exclusively in landscape mode.

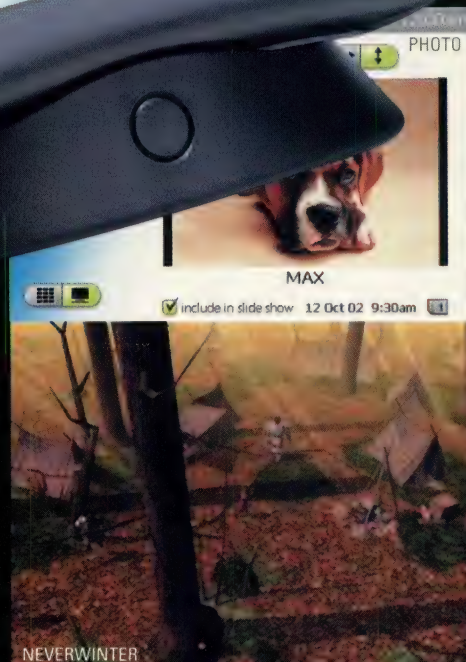


What about the games?
In a word, they rock. The accelerated ATI graphics and X-Forge 3D game engine deliver dazzling performance unlike anything you've ever seen on a handheld computer. With the earbuds on it is remarkably immersive. Unplugged, the stereo sound is surprisingly full for such small speakers, and when you bump into things the vibrator "rumbles" you. Zodiac's analog, pressure-sensitive controller makes all the difference in the world. The tiniest movements are instantly translated into precise movements on the screen. The fire buttons and color-coded button cluster feel great and are positioned right where they should be. I played with the two bundled games, as well as pre-release versions of Spy Hunter, Warfare Incorporated, MegaBowling, Table Tennis, TakTik, Flames, Billiards, and some assorted card games. Titles coming soon include Tony Hawk's Pro Skater 4, Doom II, Duke Nukem, Neverwinter Nights, Galactic Realms, and Phantom Strike. Tapwave has over 1,000 registered developers working on games for the Zodiac, so there will be no shortage of killer titles for the platform — and don't forget the more than 1,400 existing games for the Palm that you can play now.

Since I had the pleasure of receiving the first finished Zodiac to be sent to any journalist for review, I had no one to participate in multiplayer games via Bluetooth. Once we get another unit in-house, I'll write a follow up report on this intriguing capability.

What's not to like?

So what's not to like about the Zodiac? Very little. The metal stylus is excellent, but the way it clips to the back of the device is not. They designed it so that it acts as a little tilt riser, like the bar on the back of an Apple keyboard, but the clips on my test unit could be a bit tighter.



A traditional silo would be best. Plan on losing a stylus every few months and stock up on some spares. The AC charger cable connection could also be tighter to prevent accidental unplugging.

These are minor annoyances that will likely not plague shipping units, but there is one hugely disappointing problem that will not be addressed as quickly: lack of compatibility with Macintosh. It's merely a software issue, but Tapwave says they will not have Mac support ready for several months.

Though it was not ready at press time, Tapwave says there will be a full-screen web browser included with shipping units. I would also have liked to see an email client in the package, such as the excellent VersaMail. For a powerful handheld that can connect to the internet via your Bluetooth phone to lack an email app is puzzling, but Tapwave says that there are any number of fine programs out there for the choosing.

Is the Zodiac a killer PDA or a portable game console? Both. For serious twentysomething gamers who can never get enough action, a Zodiac 1 is a quantum leap beyond those wimpy, plastic GameBoys — even if one never uses the organizer functions. And for the graying executive who hasn't completely lost touch with the simple diversions of youth, a Zodiac 2 is guaranteed to please. www.tapwave.com

Motion Computing M1300

USER REPORT

Right away, three aspects of the M1300 struck me as unique: its slim profile, its big screen, and its true tablet feel. What I didn't know before setting it up at its base station was something that I came to love, and that is it's not just a great tablet, but its large screen makes it a perfect desktop replacement, or secondary desktop computer.

There was only one thing missing. There are always times that a tablet computer just doesn't let me take notes quickly enough, for the simple reason that I type faster than I can handwrite. I still prefer the pen for outlining my thoughts in a brainstorm fashion, but when it comes to expressing those thoughts, I must have a keyboard.

Motion includes a USB keyboard with the product, as well as a lightweight plastic easel stand, but too often I didn't have them along because they weren't easily made integral to the unit. I just like pulling the tablet from the sturdy pivoting base, snapping on the cover, and sliding the extra slim package into my backpack for a quick getaway. Now I can do that, and have my keyboard—along with an integral stand—all in one slim package thanks to the Hardtop Keyboard. It snaps onto the device just like the hard cover did, and adds only about a half inch to the profile. I no longer have to worry about the keys getting damaged in a bag, because they're facing the screen—which is also being protected.

Now the 1300 is three computers in one: a tablet, desktop, and notebook. Admittedly, it takes a little longer to set the new keyboard stand up, about 30 seconds compared to the three seconds it takes to open a notebook. But there's never an instance I can handwrite on my notebook, or sketch a picture, so I think I can spare the time.

The tablet

That's the long way around to saying that the M1300 is a near-ideal tablet to begin with, all it needed was this keyboard to complete the picture. It has the best mixture of a big, bright screen, nice rounded edges, and a powerful processor. Win-

dows XP almost completes the picture, with surprisingly easy network setup. I've had terrible luck with XP on my older notebooks, but no trouble with this Tablet PC version. What finally does complete the package for me is the notebook-like expansion and connectivity options available on the M1300, including modem, ethernet, VGA out, docking port, 2 USB ports, a Firewire port, audio ports, and a PC Card slot. When you put the M1300 into its nicely weighted dock all covered ports are duplicated; and the dock includes an additional USB keyboard port at the front.

In the dock it is held firmly on the bottom and right, because the holder can pivot to the left for a traditional tablet feel. I prefer it to be wide format, however. It comes in and out of the dock with ease.

The M1300 is the follow-on to Motion Computing's first offering, the M1200.

What's new is Intel's Pentium M, running at 1GHz. It is a reasonable speed improvement, but usability remains the same. That's good, because little needed improvement on the original.

Accessories

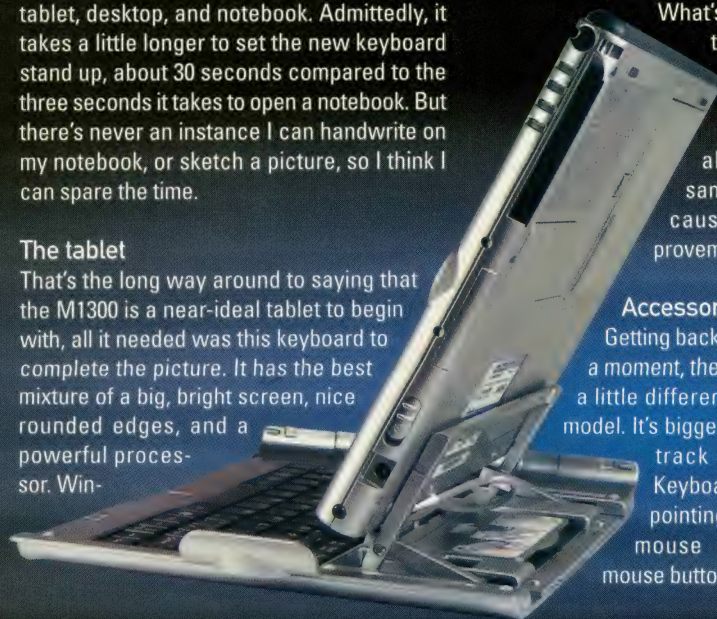
Getting back to the keyboards for a moment, the original keyboard is a little different from the snap on model. It's bigger, for one, and has a track pad. The Hardtop Keyboard is smaller, with a pointing stick, eraser-style mouse pointer and two mouse buttons at the fore. Users

should beware that while the clamp that holds the tablet

is sturdy on a desk, it's a little more precarious in the lap. That doesn't mean it won't work, but a little extra care is warranted. A notebook's main weight is in its base, but this arrangement has most of the weight in the screen. Though company photographs show the M1300 clamped into the keyboard in portrait orientation, it's not only difficult to do, it's unstable. The USB cable only just reaches the USB port in this orientation with little give, and that extra weight is constantly threatening to send the unit over.

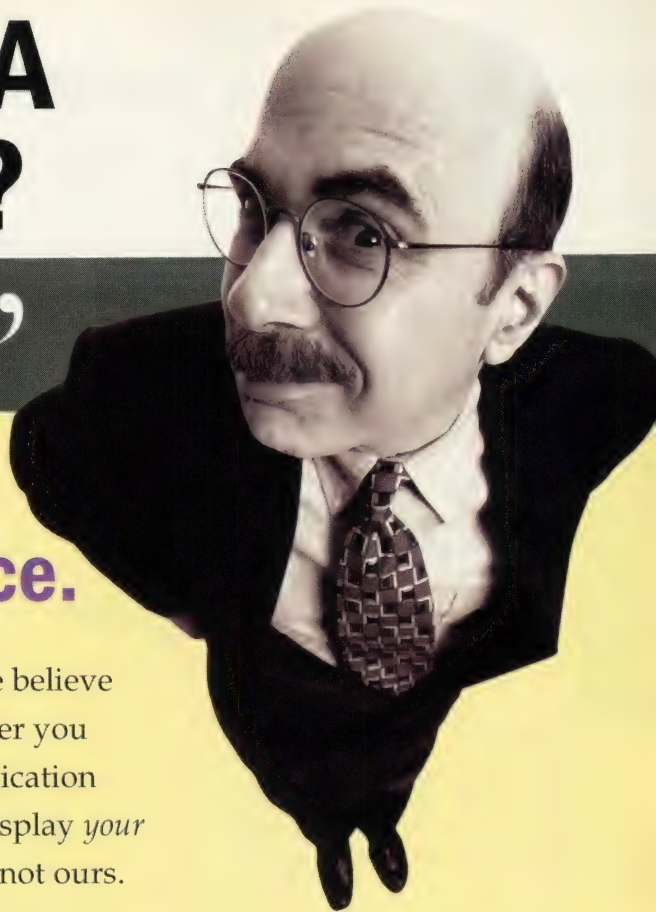
Nevertheless, I found the combination of this keyboard and the already excellent M1300 Tablet PC to be an elegant and excellent solution for all types of computing. I've gotten a substantial amount of work done on it, as well as a few sketches, outlines, and a whole gaggle of browsing. I really like grabbing the tablet from its base, slouching on the couch at the end of the day and reading about the day's happenings at my leisure. The big screen is superior to other tablets I've used for reading, whether on the desk or in the lap. Because I like to read in portrait mode, I'd like to see an additional cursor button on the side to make couch reading that much easier. The excellent software dashboard, unique to Motion Computing, could be used to activate the proper one in each mode as the user desires.

Overall, my experience with the M1300 has been excellent. Those needing a truly multi-purpose computer will find the M1300 both versatile and pleasant to use. Motion Computing has created not only a thoughtful solution, but one users will be proud to own. —Shawn Barnett



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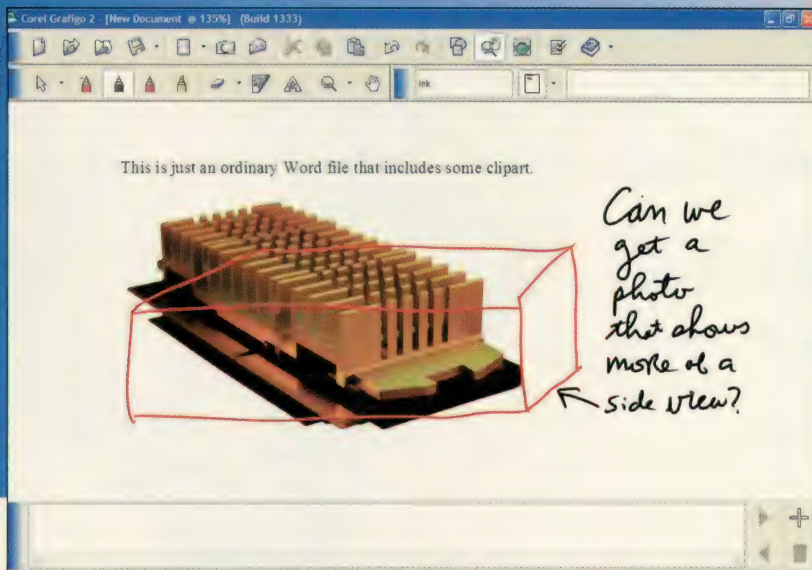


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Corel Grafigo 2

The beginning of a new category of Tablet PC software



by Geoff Walker

The launch of Grafigo 2 in September 2003 makes Corel the second company to market an updated version of a major, horizontal, Tablet PC-specific application (FranklinCovey was the first, with versions 2.0 and 2.1 of TabletPlanner in March and June 2003). Although Corel is a chronological second, Grafigo 2 may have jumped them into first place in the competition for the Tablet PC's "Killer App."

When Corel created Grafigo 1 for the launch of the Tablet PC in November 2002, they had a vision of a "graphics tool for business users." The initial release had an almost entirely graphical user interface, perhaps influenced by Corel's other graphics products such as CorelDRAW and Corel Painter. The functionality of the initial release, while on the primitive side, was certainly graphics-tool oriented – it included a shape recognizer, sketching and annotation tools, an overlay (layering) tool, and a symbol library. My initial mini-review of Grafigo 1, published in the December 2002 issue of *Pen Computing*, observed that Grafigo 1 seemed "more like a demonstration platform for Microsoft development tools and Corel's development skills as an ISV than a serious commercial application."

With the launch of Grafigo 2, Corel has created what I believe may be the beginning of a new category of Tablet PC software – general-purpose, broadly applicable, document review and annotation programs. Grafigo 2 doesn't just fulfill Corel's initial vision of a graphics tool for business users, it goes well beyond it. There's really nothing else like it on the market. It allows the average knowledge worker (a business user, not a graphics expert) to annotate, add content to and collaborate on the review of any document, graphical or not. Grafigo 2 makes Grafigo 1 look like a crude prototype.

Corel continues to promote the fact that "Grafigo 2 is written in Microsoft's C# [C-Sharp] programming language, which provides diverse opportunities for the application to be customized, to be connected to

Web services and to create enterprise-based solutions." In other words, they haven't given up on applying Corel's Tablet PC technology in vertical applications, they've just concluded that developing a really good horizontal application may be a necessary step along the path to enterprise adoption of the technology.

Workflow

In developing Grafigo 2, Corel did extensive research with Grafigo 1 users to discover what was missing and what needed to be improved. One of the fundamental results of the research was a decision to focus on "workflow" rather than on individual features. In Corel-speak, "workflow" means making sure that the program does everything the user needs to get his job done. As an illustration, consider shape recognition, which was an individual feature in Grafigo 1. The average business user doesn't actually want to recognize shapes, he just wants to get his drawing done ("complete his workflow"). Recognizing a hand-drawn square or circle and making them into clean shapes is "cool," but it's only a fraction of the user's real problem. The real work is in cleaning up the details so that the drawing "looks nice" when you're done. It's more than just squares being square – objects should line up, lines should be parallel, lines should terminate cleanly on their target without extending too far, etc. In Grafigo 2, what was "shape recognition" is now "drawing assistance," and the new function does all of this and more.

The enhancements in Grafigo 2 can be categorized into five areas: (1) document import, (2) creation and annotation capability, (3) special features, (4) user interface, and (5) collaboration. The following sections examine each of these areas in more detail.

Document Import

In Grafigo 1, the only file types that could be imported were raster (bitmap) files (JPG, TIF, BMP, etc.). This

was very limiting, since it often meant having to find a way to convert your desired target file into raster format. In Grafigo 2, you can import files from any program that (a) supports standard Windows print functionality, and (b) is installed on your Tablet PC. Part (a), the "print functionality" requirement, is because Grafigo 2 uses a "print driver" mechanism to import files (this is the same mechanism that's used in FranklinCovey's TabletPlanner electronic data store). This is a very general and powerful way to import files, since almost every program has a print function. Part (b), the "installed on your Tablet PC" requirement, is so that Grafigo 2 can use the originating program's print function to generate the file to be imported. This could be seen as a significant limitation, except that software site licenses are relatively common in the enterprise environment, so getting a copy of the originating software on your Tablet PC may not be particularly difficult or expensive.

To import a file, the user just opens the original file in Grafigo 2. Grafigo 2 automatically runs the originating program, creates the print file (in Scalable Vector Graphics [SVG] format), and opens it. Screenimage #1 shows a Word file that's been opened and annotated in Grafigo 2. The user can also create an .SVG file in the originating program by printing to the "Corel Grafigo Writer" printer, and then opening the resulting file in Grafigo 2. Screenimage #2 shows an image of the Excite webpage that was created and imported this way.

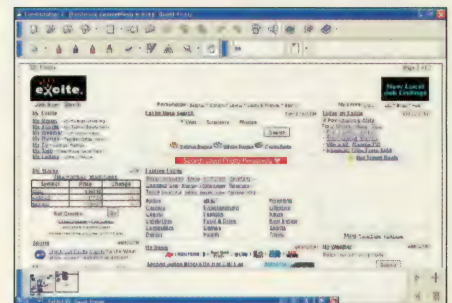
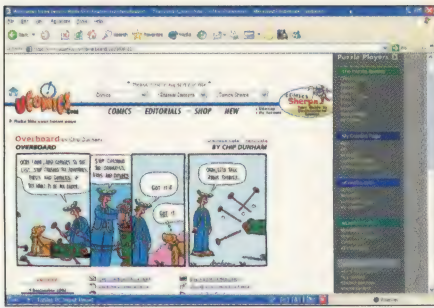


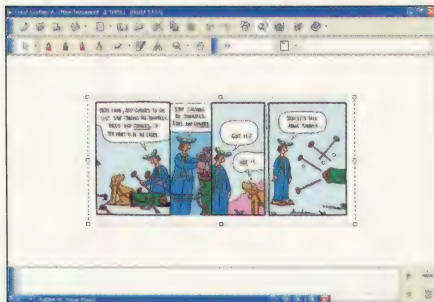
Image 2: webpage imported into Grafigo

For programs that don't have a print function, Grafigo 2 has a "Grab-It" function that works much the same as Microsoft's Snipping Tool. When the user clicks on the "Grab-It" icon in the Grafigo 2 tool bar, an always-on-top dialog box appears that instructs the user to (a) choose either the "lasso" or "rectangular" selection tool, (b) make the desired application window active, and (c) click the Start button. While the user is making a selection, the unselected portion of the active window is dimmed, which makes it very clear what is being selected. Once the selection is complete, the selection is immediately brought into Grafigo 2. It's quick and easy. Screenimages #3 and #4 on the next page show a source webpage and the captured portion in Grafigo 2.

Output or Export files written by Grafigo 2 can be of type SVG, JPG, PNG (Portable Network Graphics), GIF, TIF, BMP or EMF (Enhanced Windows Metafile). For the compressible file types, one of three levels of compression can be selected – 0%, 25% or 75%.

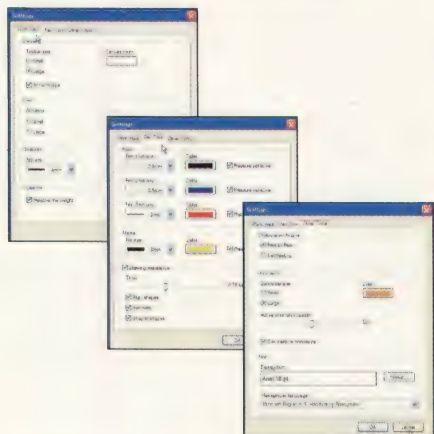


Images 3 and 4: capturing part of a webpage



Creation and Annotation

The following paragraphs briefly describe Grafigo 2's tools for creation and annotation. Screenimage #5 shows Grafigo 2's three Preferences screens, where settings for many of these tools are made.



Selection Tools: Grafigo 2 provides the standard Windows click-and-drag ("Pick") selection tool as well as a "Lasso" selection tool. When using the Grab-It function, a rectangular selection tool is also available.

Pens: There are three standard pens and one standard marker on the toolbar, each of which can be made pressure-sensitive, set to any color (marker ink is semi-transparent) and set to one of seven line widths from 0.25 mm to 16 mm.

Resizing, Rotating and Erasing Ink: Any ink stroke can be resized, stretched, rotated, or erased whole or in part. When resizing ink strokes, you can choose whether to have the line weight change proportionally or not.

Exporting and Importing Ink: You can select ink in Grafigo 2 and drag it into any other application. If the destination program supports ink (such as Microsoft Jour-

nal), the ink strokes will be inserted as ink. If the program doesn't support ink (such as CorelDRAW), the ink strokes will be inserted as a raster (bitmap) image.

Underlays: The ability to put an image (called an underlay) under the workspace has been expanded considerably in Grafigo 2. Underlays can be moved, resized and deleted. You can bring in multi-page documents as underlays; each page is brought in as a separate underlay and is added as a thumbnail to the View Manager.

Onionskins: Onionskins are translucent overlays used for annotating or marking up documents without modifying the original; they can be used like tracing paper. Onionskins can be shown or hidden, locked or unlocked. Separating the viewing and locking functions allows you to keep an onionskin visible while you're actually drawing on the original document.

Zoom: Clicking on the Zoom button and then clicking on the workspace zooms in by 200%. Holding the pen barrel button and clicking on the workspace zooms out by the same amount. You can also select a rectangular area to be zoomed in. Clicking on the Zoom flyout control brings up a slider that allows adjusting the zoom to any amount between 25% and 400%.

Gestures: Grafigo 2 supports seven gestures: Erase (the standard Tablet PC scratch-out gesture), Undo / Redo (upside-down semicircles), Zoom In / Zoom Out (upstroke and downstroke), and Up One Onionskin Layer / Down One Onionskin Layer (chevron-right and chevron-left).

Text: Text can be added to a Grafigo 2 document in several ways. Once you create a text frame, you can type on the keyboard or use the Tablet PC Input Panel. You can write ink anywhere in the workspace, select it and convert it to text, or you can write directly



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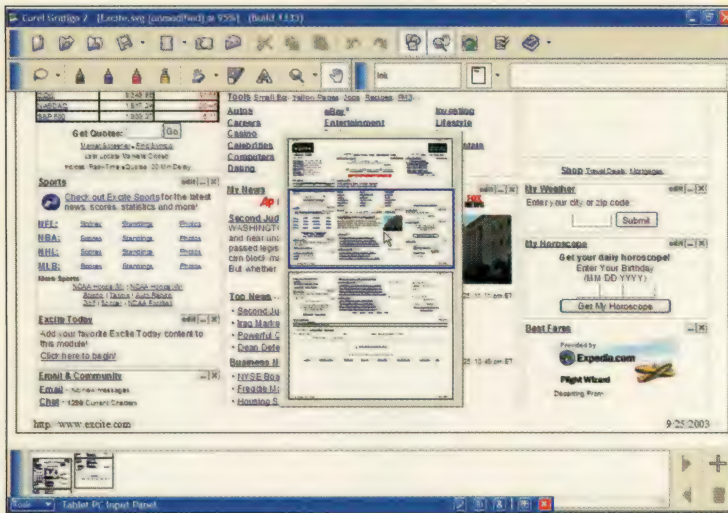
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Images 6: Grafigo Navigator on top of a webpage

in a text frame and Grafigo 2 will automatically convert the ink to text. You can copy and paste text from another document. (Grafigo 2 uses standard Tablet PC handwriting recognition technology; there is no enhancement of the recognition or the user interface.)

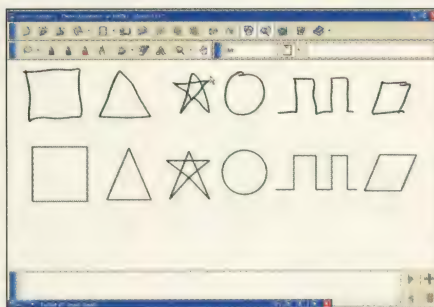
There is one serious, major limitation in Grafigo 2's handling of text: all font settings (font, size, style and color) apply to all text in all text frames. There's no way to make some text different (e.g., larger) than other text. Even if you create text externally with the characteristics you want, when you bring it into Grafigo 2, the single set of global text properties is applied to it. This limitation may seriously affect the product's usefulness for some applications and is likely to frustrate some users.

Special Features

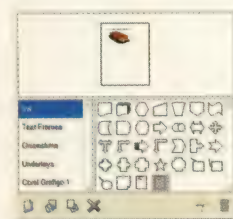
Navigation: One of the more difficult aspects of Grafigo 1's user interface was figuring out where you were on the "endless canvas". In Grafigo 2, this problem has been solved in several creative ways. First, the Pan tool lets you drag the window around the canvas. Second, if you press the pen barrel button and then move within proximity (or touch the screen), a pop-up window (called the Navigator) appears that contains a graphic of the entire canvas and a blue outline indicating the current window position. The blue outline can be dragged anywhere within the Navigator window; when you release the pen button, the current view moves to the desired location in the canvas. (Screenimage #6 shows the Navigator on top of the Excite webpage image.) Third, once you have selected an object such as an ink stroke or text frame, Grafigo 2 automatically moves the document view in the direction you're dragging the selected object (Grafigo 2 calls this "auto-panning").

Drawing Assistance: The purpose of the Drawing Assistance function is to let you apply ink strokes with precision. Drawing Assistance uses shape recognition and Bezier curve smoothing to straighten and neaten shapes (arrows, circles, squares, triangles, stars, etc.) and make them more symmetrical. The function also provides line straightening and collinear alignment (for example, automatically adjusting a staircase pattern to have exactly vertical and horizontal segments with exactly 90-degree angles). Drawing Assistance also lets

you snap lines and curves to other lines and shapes. For example, if you draw a figure where the lines don't quite meet, Grafigo 2 will clean it up so that the lines meet properly ("auto-closing"). Drawing Assistance can be turned on and off, with alignment, symmetry and snapping all individually controllable. A settable timer is included that controls how quickly Drawing Assistance kicks in after you lift the pen; this makes it easier to create multi-stroke shapes. The use of Undo with Drawing Assistance can also be quite useful, since you can keep trying until you get the result you want. Screenimage #7 shows two rows of shapes; the top row was drawn with Drawing Assistance turned off, then it was turned on for the bottom row.



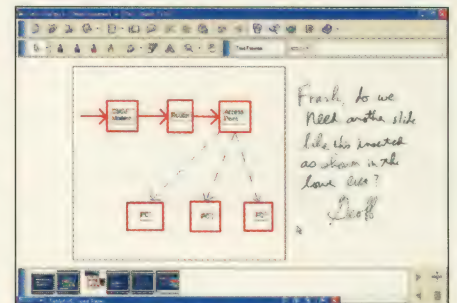
Library Manager: In Grafigo 1, the Symbol Palette was a collection of graphic symbols (and nothing else). In Grafigo 2, this capability has been expanded into a much more powerful, general-purpose library function. The library can store and display any content that you want to reuse in Grafigo 2, including text, ink, underlays (images) and onionskins. You can create your own categories of content, so you can organize the



content in a way that makes sense to you (for example, by subject or project, rather than by data type). Categories can be customized as needed. You can reorder them, rename them, add content (by drag-and-drop), delete content, rearrange items within them or move content between them. Library content (an entire category) can be exported to be shared by other users or imported for your own use. Screenimage #8 shows the default structure of the Library Manager.

View Manager: You can save any view of a document (consisting of a location in the document and a given magnification setting) in the View Manager. This view can be called up at any time by clicking on the view thumbnail in the View Manager toolbar. The view is saved in the properties of the file, so it is always avail-

able. One obvious application of the View Manager is in annotating PowerPoint slide presentations, where each slide automatically becomes a separate view. Jumping from slide to slide is quick and easy – just click on the thumbnails in the View Manager toolbar. New (hand-sketched) slides can be inserted by just creating a new view. Screenimage #9 shows a five-slide PowerPoint presentation that's been imported into Grafigo 2, with a suggested (hand-sketched) sixth slide inserted between the second and third slides in the View Manager toolbar.



Sending to Email: There's a button on the toolbar that brings you directly into your default email client, with the current canvas attached to a new email as an .SVG file. Corel's concept is to provide as much capability as possible in Grafigo 2, so the user doesn't have to rely on other programs. In actuality, sending to email really isn't very practical, since you can't control the size of the attached file. For example, the Word file in screenimage #1 appeared as a 2 MB attached file when Grafigo 2 brought it in as an uncompressed .SVG file into email. The same file zipped (using WinZip 8.1) was only 800 KB.

User Interface

The user interface in Grafigo 2 (which you can see in many of the screenimages in this article) looks more like a standard business application and less like the "graphic artist's workspace" of Grafigo 1. Grafigo 2 provides a lot of control over the visual appearance and organization of the workspace. You can do any of the following:

- Dock or undock toolbars
- Hide or change the size of toolbars
- Change the size of toolbar buttons
- Add a background color
- Add a large or small grid
- Hide or display the grid
- Change the color of the grid

Difficult Layers

The most difficult aspect of using Grafigo 2 is understanding how to use and manipulate the layers. This is where it gets close to being more like a traditional graphics application. A Grafigo 2 drawing can be made up of multiple layers, each containing a portion of the drawing's contents. There can be one or more underlays (images), the document workspace itself that can include ink strokes and text frames, and one or more onionskins (overlays), each of which can include ink strokes and text frames. Layers can be moved rel-

ative to each other, for example, an underlay can be moved and placed on an onionskin. Onionskins can be hidden, made more or less transparent, or have their color changed. The rules describing where ink can be located in the layer structure, how copy and paste works between layers, how to intermix layers of ink and text, and other such topics are even more complex. Figuring out how to make best and practical use of this structure is very difficult, to say the least. The Grafigo 2 User's Guide helps a little, but not much. While most of the product is relatively simple to learn with some assistance from the built-in Help, a few tutorial exercises would be a huge benefit in this area.

SVG Viewer

Corel released an updated SVG Viewer along with Grafigo 2. The Viewer is a browser plug-in that supports SVG files, much like a PDF plug-in supports PDF files. The primary visible enhancement in the SVG Viewer is a toolbar that helps navigate multi-page documents.

Collaboration

Collaboration in Grafigo 1 was limited to Microsoft Net-Meeting, which isn't a very commonly used application. Grafigo 2 adds support for Microsoft Peer-to-Peer (P2P) collaboration technology (see <http://msdn.microsoft.com/library/default.asp?url=/downloads/list/winxppeer.asp> for a brief introduction). Although Microsoft Peer-to-Peer (P2P) technology requires the Advanced

Networking Pack in Windows XP Service Pack 1 (included in version 1.0 of Windows XP Tablet PC Edition), it doesn't require a "helper" application such as Net-Meeting. Grafigo 2 users can directly connect to each other via any available medium.

In order to begin an initial collaboration session, everyone must send their User Identifier File (UIF) to the "host" user via email (or via file sharing, if the collaboration session exists on a single wired or wireless network). The UIF contains the user's display name, P2P ID and various other technical data. UIF information is stored in a "contact list" in Grafigo 2, which allows easy reuse. Once all the UIF files are received, the host user issues collaboration invitations to the "guest" users (the invitations automatically include the host's UIF). Once the session starts, the document in the host's workspace is displayed in the workspace of all the guests. Any changes made on one computer appear on all the others. During a session, only the host can open underlays and draw in the workspace (i.e., on the original document). All the guests must draw on onionskins (overlays) that they create. At the end of the session, all of the guests' onionskins become part of the original document. During a session, each user can set a "presence" indicator that shows whether he is available. A user can participate in only one collaboration session at a time.

Summary

Corel has made a big step forward with Grafigo 2. The application holds a lot of promise as a general-purpose,

broadly applicable, document review and annotation program. The top three enhancements include (1) the ability to import almost any file, (2) new and improved annotation tools, and (3) expansion of "shape recognition" into a full-fledged "drawing assistance" function. With the exception of the details of the layering architecture, Grafigo 2 is quite easy to learn. Most of the creation and annotation tools work well and are suited for their function, except for the text editing capability, which is crippled by the limit of a single, application-wide font setting. Corel is one of the first, if not the first, company to implement Microsoft's latest Peer-to-Peer technology for collaboration; the resulting functionality is relatively easy to use (compared, for example, to Groove Networks' collaboration program). For an enterprise user (i.e., knowledge worker), Grafigo 2 makes sense and is worth the money.

Logistics

Grafigo 2 is available today via Electronic Software Download (ESD) from Corel (www.corel.com/grafigo). A 15-day trial version is offered; the product retails for \$99 (USD) or \$149 (CDN). 

Based in Silicon Valley, Geoff Walker is a consultant with Walker Mobile, LLC. Geoff has worked on the engineering and marketing of mobile computers since 1982 at GRiD Systems, Fujitsu Personal Systems (now Fujitsu PC) and Handspring. He can be contacted at geoff.walker@att.net.

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Mobility

The Expanding World of Bluetooth

With a list of products integrating the technology numbering well above 1,000, Bluetooth is nevertheless relatively unknown by the American consumer. Though many companies have integrated Bluetooth into their higher-end products, it is far from common. Still, the criticism that used to plague the 2.45 GHz wireless networking standard—that there were few devices to choose from—is no longer relevant. Not only many products, but many product categories now use the wireless standard: phones, PDAs, PCs, portable games, keyboards, cameras, printers, GPS devices, and even automobiles can be purchased with Bluetooth built in. The remaining questions are why more of these devices are not in use and what it will take to popularize them.

Where it is now

Bluetooth in the United States is primarily used by technology enthusiasts, those who keep up with the latest trends in electronics and computing. This group of customers generally has the desire and drive to make a given technology work for them to address a certain need, like retrieving data onto their PDA while mobile. Many will also do it just because it's interesting technology. The rest of the market, those without this drive, might try the technology on the advice of a salesman, but give up when it doesn't work right away, as they do with their cell phone's address book, let alone more complicated functions like three way calling and email.

The first major example of a small Personal Area Network (known as a PAN or Piconet) available in the US was a trio made up of a Bluetooth-enabled Palm, cell phone, and headset. In a collaboration between Sony Ericsson and Palm, software wizards were written that made the setup easy, walking the user through a basic questionnaire and handling the raw details behind the scenes. Though it eliminated many of the carrier-specific settings that would have made the setup a nightmare for users to handle, it is still not without flaws. Once two units are paired, for example, they stay paired. But an auto-shutdown during a connection, as happens on most Palms after two minutes of inactivity, can make the device unable to re-connect to the phone until the unit is reset. After the reset, the pairing resumes, but a hardware reset should not be an everyday occurrence in a non-Microsoft product. Clearly the connection needs to be made more self-healing.

The problem

As currently specified, Bluetooth must be thought of as a cable replacement. We're all still going to need charger cables, but anyone who's tried to connect a PDA to a cell phone knows that finding a cable that works with both your particular PDA and cell phone's connector is very difficult; in many cases it's impossible. Provided both devices are Bluetooth-enabled, however, they should be able to connect without issue.

But there's still a problem. Just as a cable requires a connector at either end, the invisible cable of Bluetooth requires a driver at each end, one that is designed to interface with the particular type of device; indeed between two different kinds of devices. The link between Palm Tungsten T and Sony Ericsson T68i is easy because the two companies set out to make it so. The third component of this Piconet, the wireless headset, works only with the T68i. It was only designed

for cell phones. Though the Tungsten T can output audio, and has a built-in voice recorder, it doesn't appear possible to use the

wireless headset with the T. Nobody considered that you'd want to, apparently. At the very least a software driver would be required to enable audio to go from the Palm to the headset, and perhaps even some hardware modifications, since the audio output of the T is likely limited to the headphone jack and built-in speaker.

A user could utilize both the speaker and mic on a Bluetooth headset to listen to and take voice messages, and even use VOIP software for economical communication through a Bluetooth-enabled LAN, so it is odd that this function remains omitted from the Palm. The greater limitation might be built into the headset itself, since there is no easy way to switch between two devices. So here's a non-connector-specific device that can be compatible with many different devices, yet it's designed to be married to only one device at a time due to lack of an interface—like a screen—to make switching between devices easy.

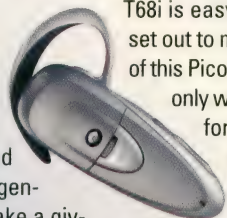
So you can see that though having no connectors makes communication easier, it presents a whole new set of problems. It's a fact when making a product that you spend just enough time to make it do what you intend, and stop there so you can get it to market and start making money. It won't be until customers and engineers spend more time with existing products that they'll see where improvements can be made. Just like internet access and email were once a complicated nightmare to setup, and sending a UU or MIME encoded picture was a multi-step process, now users just drag, drop, and click to send photographs over the Internet. Given that example, it should be a relatively short time for Bluetooth connections to become as easy.

Why it's needed

Just take a look at the back of your computer to see why we need Bluetooth. Mine is a jumble of cables that I can barely shine light through. Removing a single cable usually requires getting on the floor and spending a good five to ten minutes of de-tangling. A set of products that operate with fewer wires between them would make our computing world a better, cleaner place. Yes, we'll still need the power cables, but wouldn't it be nice to have half as many overall? Cables running only to one or two power strips is far better without as many cables running between devices, as happens with speakers, monitor, modem, keyboard, and mouse, not to mention the tangle of USB cables for peripherals.

Two of the more recent additions to the Bluetooth world are the wireless keyboard and mouse. This one doesn't make much sense to me. It's cool, but you're eventually going to have to charge these devices, something that requires a cable; how is that different from having the current cable that provides both data and power? It does offer more portability, but the portability argument works better for truly portable devices, and the keyboard is not of necessity portable. If you're typing, you need to be close to the monitor, so a cable isn't that troublesome.

As for portable devices, like a PDA, here it's not as compelling when referring to desktop sync, because the device is typically charged in a cradle, which again provides data transport and charging. And HotSync via Bluetooth, frankly, is nowhere near as fast as a cradle.



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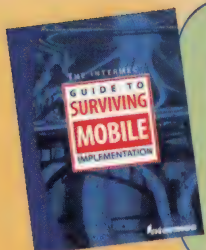
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Were HotSync to take place more automatically, however, with agents delivering the morning news and email without your asking, there's a bit more value to be had.

It's when we're on the road that Bluetooth becomes truly useful. I can check my email with just my Palm Tungsten T. No cables needed. I can even leave my T68i in my bag. I just tap on the send and receive icon and the Palm connects to the cell phone, which connects to the Internet in a flash. I can also just look up an address in the Palm Address Book, and tap on the number to dial my T68i. And when it's working properly, my Plantronics M1000 headset grabs the call and puts it in my ear as I put my T away and place the cell phone where it gets the best reception, up to 10 feet away from me.

I can likewise use the T68i to go on the Internet with my notebook computer. No cables needed, and I don't have to be in a Starbucks. The built-in Bluetooth in both devices does it all with just a swish of the mouse. Swish and click.

This all adds up to fewer cables in my bag. I can't tell you how many times I've forgotten just one simple cable and ruined all my mobile computing capability. That'll still be a problem with power supplies, but eliminating half the problem is a good start.

There's also some advantage to Bluetooth-equipped devices in the workplace, allowing mobile retrieval of data from the intranet, Internet, and email. Though 802.11b is a little better for online campus access due to its higher speed and greater range, it's possible to outfit an office with both. Bluetooth offers the advantage of lower power requirements, ideal for mobile devices. That includes both handhelds and notebooks: If you've watched the battery gauge of your notebook, you know it moves slower with WiFi turned off or unplugged. Bluetooth devices actually communicate to determine just how much power they need to use, selecting the lowest possible power for the given distance. This provides the dual function of saving power and reducing the possibility of interference with other devices sharing the same 2.4GHz range. Power output is around 1 milliwatt, whereas the average handheld cell phone outputs about .5 watts. As a result, range is limited to less than 10 meters.

Where it's going

One of the more frustrating aspects of the Bluetooth landscape is nailing down just what's going to be possible with the new products coming over the horizon. I can use my imagination and tell you the possibilities given the vague descriptions I've read



and heard, but we won't truly know until each of the products arrive for testing. The Bluetooth manufacturers seem oddly more vague than others, and it can't all be explained away by fear of competition.



Autos

A few model cars will be rolling this year with Bluetooth built in. Chrysler, BMW, Audi, Lincoln, and Toyota are announcing or already shipping cars with limited Bluetooth capability. Most of what I've seen seems at first to be little more than a built-in wireless handsfree mode for your Bluetooth cell phone, patching audio through the car speakers. In the case of the Chrysler, their U Connect system does a little more. With a press on the mirror-mounted dial button, users can give voice dial commands, which are verified by the car's voice synthesizer. The caller ID for incoming calls appears on a dashboard-mounted LED display, and the voice of the caller indeed comes through the car's speakers.

Systems that will use Visteon's system will be able to transfer files between notebooks and PDAs to the car's computer. The address data could then be used to create turn-by-turn directions. In the future, Bluetooth-enabled gas pumps might connect with the car and pay for the transaction completely sans plastic. Special Bluetooth-equipped sensors could generate a warning of low tire pressure and send them to the user's PDA. Doors could be unlocked as a user approaches with their PDA or Bluetooth key; this is seen in the new Toyota Prius.

And rather than using an unreliable FM signal to send MP3 songs from a notebook or PDA to the stereo, such a car could receive the data via a Bluetooth signal. While a memory card would also serve, card standards change often enough—and differ between PDAs—that Bluetooth would be more eco-

nomical and offer greater compatibility, serving as a virtual universal connector across device types.

Gaming

The ad hoc nature of Bluetooth, meaning that it can

connect to other, similar devices without a central wireless hub, makes it ideal for local area data exchange. That goes beyond beaming a contact to another handheld, though that is possible. Beaming via Infrared is one way to connect two PDAs for gaming, but imagine not hav-

ing to keep your device pointed at your opponent. You could even be in different rooms and keep playing (for the terribly obsessed gamer). Tapwave's new Zodiac uses Bluetooth for just such a purpose.

I don't envy the teachers of the future.

PCs

In addition to the already-mentioned keyboard and mouse solutions, many mobile peripherals can now connect via Bluetooth, eliminating yet another cable as we expand our digital universe. My junk drawers are getting more and more stuffed with cables from device after device, each of which has a different proprietary connector. I'd put up with a somewhat slower connection if more future products offered cable-free connections. Naturally, this will require Bluetooth to become standard in more PCs, but this is slowly happening.

The good news is that adding Bluetooth to your PC is very simple. It's easier than adding it to your PDA, thanks to the now ubiquitous USB adapter. It's usually a small dongle, about one inch long, that either plugs in via a 10 inch cable or else directly into the port itself like a Lexar Jump Drive. A few models attach via either method. Most are available for between US\$50 and US\$100. The TDK and BlueGear models I've tested have installed quickly, and work pretty well with all devices I've tried.

PC and PDA Accessories

One of the more promising devices is the Toshiba HOPBIT Bluetooth hard drive. Imagine a 5GB hard drive that requires no cable to send or receive data. Once paired with a given device it could quietly collect and store data with no physical connection, as well as serve it up. The device is expected to work with a number of PDAs, including Pocket PCs and Palms; though as of this writing there is some doubt as to whether it will ship at all. Did

I say promising? The idea is good enough that there's hope.

Also in the cool department is the Bluetooth GPS module. This is a natural, since you always want to put your GPS where it'll get the most signal, way up on the dash—and that's not usually where you want to put your handheld. The good news is that this is already shipping to all who can handle US\$200



- 250 for the ultimate in cool accessories.

On the industrial utility front, there's the BaracodaPen-cil, a barcode-scanning pen that not only scans barcodes and sends them wirelessly to the device of your choice, it also works as a stylus for your Pen-based PDA or PC. US\$249. www.baracoda.us

While on the subject of pens, many Pen readers may recall the Anoto pen, which records a user's input using special paper and transmits it via cable or Bluetooth to a cell phone, PC, or PDA. Several manufacturers have taken the concept and run with it, including Sony Ericsson, with their CHA-30 Chatpen. When used with Anoto paper, it transmits your scrawl via Bluetooth to your cell phone, which then emails a graphical image of your handwriting to whomever you choose. Frankly, while cool, it's probably way ahead of its time for this market; but its exclusion of yet another cable just might give it that extra push toward acceptance.

Finally, there are serial cable replacements, allowing RS232 data to pass between two Bluetooth transmitters. The price is steep, however, at around US\$500.

Personal electronics

Here's where the possibilities explode. Digital cameras, stereos, microphones, televisions, and remotes can benefit from a Bluetooth radio to connect them throughout the house. Few products exist as yet, but I can imagine wireless adapter plugs that replace RCA cables for sending music from my PC to my stereo receiver. But it's mobility that's important, and the Bluetooth Stereo headset has already been born, available from openbrain.co.kr (pre-release samples US\$250) and impulsesoft.com (this one is still in development). This is a natural, and the device should be adaptable for use with PDAs and notebooks as well.

Sony has demonstrated a remote control and video transfer capability between several of their video cameras and their CLIE TG50 handheld. Record, play, still capture, and even zoom can be controlled from the TG50, and

video feed comes live straight to the handheld from the camera. It's very impressive.

Without soldering a single connection, a programmer in Denmark was able to make a Tungsten T connect to a Macintosh for pretty comprehensive remote control, including some two-way functionality. Photos can be browsed on the T via Bluetooth—photos that actually reside in the Apple iPhoto program. The iTunes application can also be remotely controlled; even the album cover comes over to the T in some cases; and finally, presentations can be controlled from the Bluetooth-capable T, with slideshow notes appearing on the handheld. This represents the beauty of the technology: a wireless handheld and wireless PC married together by a simple programmer's wizardry. (See full story on the Salling Clicker in the Palm Section.)

As personal electronics become more computerized, Bluetooth could play a far bigger role. Indeed, even home electronics could be revolutionized by this small radio standard. Current X10 homes, those controlled by a central computer to dim the lights, adjust the heat, and open the windows depending on pre-programmed circumstances, have to be built with the wires pre-routed for a decent comprehensive install. But X10 products that connect via Bluetooth would be better able to permeate the far larger market of existing homes rather than waiting for control-minded customers to build a million-dollar home.

Printing

Though the first products I've seen have been slow, it's still amazing to see a printer outputting pages without a cable connected. Here's another place where Bluetooth is more natural in a mobile environment. I can deal with a cable between my PC and printer, but if I'm on the road that extra cable is go-

ing to make me angry—especially when I leave it behind. It'll become even more important to truly mobile workers. A Bluetooth printer in the car can output an estimate or receipt as fast as the printer will crank it out. I can't tell you how many people have come up to me and asked for this solution. It's already out there, but how much more convenient it would be without IrDA or a cable. HP already has a BT printer for the job: the HP 995c Bluetooth Printer.

More valuable to the pedestrian mobile computer worker is the line of thermal printers from Zebra Technologies Corp. Their ruggedized QL 320 and QL 420 printers can accept Bluetooth transmissions and turn them into printouts on labels or receipt paper right from the hip.

Just before completion of this article, palmOne's T3 arrived on my desk. It has a new status bar along the bottom with a Bluetooth

button. With a simple tap users are able to connect and disconnect, and easily switch between different connections with two taps. I'll take this as evidence that Bluetooth integration will get easier to understand and use.

In the end Bluetooth is just a wireless standard, really little different from a bare wire with no connectors. It's up to the individual manufacturers to work with each other to make it work well enough for consumers to care.

Bluetooth 1.2 is also due to come out soon. Backward compatible, it will include Adaptive Frequency Hopping to better cope with 802.11b networks, as well as voice processing and security improvements. Even more consumer products are poised to use the standard, and more products in the market will make it more likely that users will come across and learn to use the technology, taking it out of the realm of the techno geek and into the mainstream.

—Shawn Barnett

For more on Bluetooth products visit blueunplugged.com and bluetooth.com



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Panasonic Toughbook CF-W2

PANASONIC'S LATEST ULTRALITE

BY CONRAD H. BLICKENSTORFER



BRIEF

With the CF-W2, Panasonic added yet another model to its growing line of durable, magnesium-clad ultralight notebooks. Using Intel Centrino technology with a 900 MHz M processor, the W2 is speedy and energy-efficient, the latter thanks to a very powerful Lithium-Ion battery pack. We've seen over five hours between charges. Best of all, the W2 comes with an internal DVD/CD-RW drive, eliminating the need to carry around an external drive. Even so, the W2 weighs less than three pounds and has a footprint smaller than that of a 8-1/2 x 11 sheet of paper. We love the full-size keyboard and integrated wireless LAN which leaves the PC Card slot available for other uses. The 12.1-inch display is bright and crisp, and comes with fairly effective anti-glare coating for outdoor use.

DURABILITY

A durable rather than rugged device, the magnesium W2 is well made, but feels a bit less sturdy than other Panasonic ultralights.

COMPETITION

Ultralights from most major notebook manufacturers, though few offer the extra toughness of magnesium construction.

CONTACT US

<http://www.panasonic.com/toughbook>

My first impression of the new Panasonic Toughbook CF-W2: It's sitting on my lap and I am watching a DVD movie on it. The picture is perfect, without any delays or pixelation. Despite having just one speaker, the sound is quite acceptable. The computer warms up a bit but not excessively so. After the 95-minute movie is over I check the battery. 83% remaining. Wow.

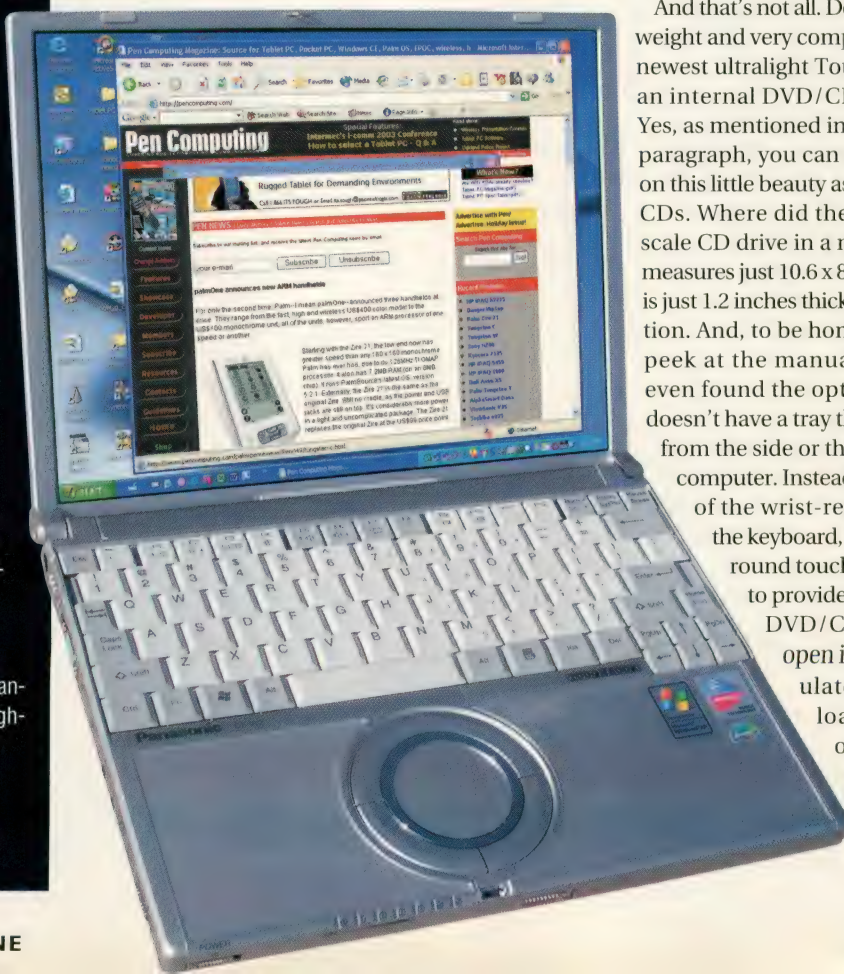
The Toughbook CF-W2 is the latest addition to Panasonic's lineup of elegant, innovative ultralights that began complementing the company's traditional ruggedized notebooks last year. First there was the minuscule 2.2-pound Toughbook CF-R1 (see full review in *Pen Computing* Issue 47) with its 10.4 inch display and not-quite-full-scale keyboard. Panasonic wasn't sure if it was big enough for the US market and brought it here on a trial basis. We loved it and it looks like it's here to stay. The R1 was quickly followed by the more grown-up CF-T1 that has

a full size keyboard and a 12.1-inch display, yet weighs only 10% more than the little R1. We reviewed the T1 in *Pen Computing* Issue 48 and loved it, only wishing for built-in wireless LAN and perhaps an internal optical drive. In fact, we liked it so much that we awarded it a 2003 Editor's Choice for Best Durable Ultralight.

Enter the Toughbook CF-W2. It addresses all of our wishes and then some.

It's Centrino-based, which, on the outside, means that the familiar "Intel Inside" sticker has been replaced with the new red and blue Intel Inside/Centrino Mobile Technology sticker. The T1's ultra-low-voltage 866MHz Pentium III-M has been replaced by an equally ultra-low-voltage 900MHz Pentium M processor with double the L2 cache (1MB instead of 512KB), the Intel 855 chipset, a much faster system bus (400MHz instead of 133MHz), and all the other Centrino Technology goodies, among them the integrated 802.11b wireless LAN module.

And that's not all. Despite its light weight and very compact size, this newest ultralight Toughbook has an internal DVD/CD-RW drive. Yes, as mentioned in the opening paragraph, you can watch DVDs on this little beauty as well as burn CDs. Where did they put a full-scale CD drive in a machine that measures just 10.6 x 8.3 inches and is just 1.2 inches thick? Good question. And, to be honest, it took a peek at the manual before we even found the optical drive. It doesn't have a tray that slides out from the side or the front of the computer. Instead, the left side of the wrist-rest in front of the keyboard, including the round touchpad, flips up to provide access to the DVD/CD drive. To open it you manipulate a spring-loaded switch on the left side of the case. Very clever. But





Free at Last!



Whether you sell houses, attend patients, sit in classrooms, or just take a lot of notes in business meetings, FIC SlateVision Tablet PC with Microsoft® Windows® XP Tablet PC Edition will make a believer out of you. Imagine the freedom of paperless notes or sketches. Picture the simplicity of moving your handwritten forms, minutes, or reports onto your PC to edit or print.

Industry critics rave about SlateVision and predict "given the system's price and features, many users will opt for the SlateVision if they...try the unit [which compares to] tablets from HP, Acer, and Toshiba" (AnandTech.com, Dec. 12, 2002).

FIC SlateVision is light, has a superior LCD screen that feels almost like writing on paper, and, with the Transmeta CPU, has an exceptionally long battery life. Carry it with you as you would a paper notebook. It's the easy, natural way to create records and store them. Once you try it out, you'll never go back. Like many others, you'll be crying, "Free at last!"



Micro Pro

SLATEVISION



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Phone: 510-252-7777 Fax: 510-252-8888

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EXCEPTIONAL BATTERY LIFE AND AN INTERNAL DVD/CD-RW DRIVE MAKE THE 2.8 POUND PANASONIC W2 A VERY ATTRACTIVE BUY

that's still not all. Panasonic also beefed up the already powerful battery of the CF-T1. Like in that machine, the CF-W2's battery attaches onto the backside of the computer, adding a "power bulge" that contributes a bit of thickness but also acts as a keyboard stand and provides airspace under the unit which aids cooling. The battery is considerably wider than that of the T1. We're talking a 7.4 Volt/6.6 Ah Panasonic Li-Ion pack here, almost 50 Watt-Hours of energy. That's a good deal more punch than any of the first generation Tablet PCs had to offer. The W2's manual indicates an operating time of 7.5 hours, which places this machine squarely into Pocket PC territory.

In terms of design and execution we found the T1 to be near perfect. How does the CF-W2 compare? First of all, thought it's almost the same size and uses many of the same parts and design elements, it is really a different machine. Both are made of magnesium, but whereas the T1 looked like a miniature Toughbook, the W2 seems softer and smoother. The wrist rest in front of the keyboard has a brushed finish instead of the power-coated ribbed part on the T1. The top of the W2 is differently designed, glossier and has a much finer-grain powder finish, and the Panasonic logo looks the other way. The hinge designs look identical, but the W2's is looser. Ports are identical on both machines, but some of them have been moved to different locations, presumably to make room for the internal optical drive. Neither unit has a fan, but the W2 has a heat vent at the bottom that helps it to run noticeably cooler than the T1, but also provides extra exposure of the W2's electronics to the outside. I've always like the unconventional round touchpad in the ultra-light Panasonics, and the W2's is no exception. The unique design of the optical drive cover works well and when you look at the intricate design of the bottom of the drive cover you can't help but be awed by the talent of the engineers who designed this beauty.

From a connectivity standpoint, the CF-W2 is fully equipped. On the right side is a PC Card Type II/III slot and a SD/MMC card slot underneath it. Since the W2 has built-in wireless LAN, the PC Card slot stays free for whatever other use you might have. I often use mine to transfer images from my digital camera via a CF Card adapter. The SD card slot comes in handy for moving data between devices and for backing up my most important files. Next to those two card slots are an RJ-11 jack for the internal V.92 modem and a RJ-45 jack for 100BaseT wired LAN. On the left side you'll find two USB 2.0 connectors, stereo out and microphone

jacks, and a VGA interface that supports up to 1600 x 1200 external video. Along the front is a battery of seven annunciator LEDs. Missing is an IR port. No big deal, but I like to have one to sync my Pocket PCs.

On the software side, the CF-W2 can be ordered with the professional versions of either Windows 2000 or Windows XP. Ours came with Windows XP, a number of Panasonic utilities and online manuals, InterVideo WinDVD and B's Recorder Gold 5.



PANASONIC CF-W2 SPECIFICATIONS

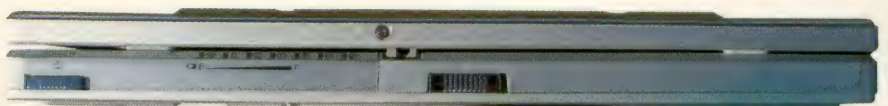
COMPANY	Panasonic
PRODUCT	Toughbook CF-W2
PROCESSOR	900MHz Intel Pentium M with 1MB L2 cache
OPERATING SYSTEM	Windows XP Professional (2000 available)
COMMUNICATIONS	56k modem, Intel PRO/Wireless 2100 802.11b LAN
MEMORY CONFIGURATION	356-512MB PC-2100 DDR SDRAM
DRIVES	40GB hard drive, DVD-ROM/CD-RW combo drive
SLOTS	1 PC Card Type II, 1 SD/MMC Card
DISPLAY	12.1-inch 1024 x 768 anti-glare TFT
KEYBOARD	85-key full-scale with keypad
PEN/DIGITIZER	NA
DIMENSIONS	10.6 x 8.3 x 1.2 to 1.6 inches
WEIGHT	2.8 pounds including battery
HOUSING	Magnesium
OPERATING TEMPERATURE	-4 to 122 degree Fahrenheit
ENVIRONMENTAL RESISTANCE	NEMA IP67; 4-foot drop
POWER	Replaceable 50 Watt-Hour Li-Ion battery pack (4-5 hours)
INTERFACE	RJ45, audio in/out, speaker, mic., 2 USB 2.0, video, V.92 modem
OPTIONS	Li-Ion battery, external floppy drive, AC adapter, memory
PRICE	US\$2,199
CONTACT	www.panasonic.com/toughbook

The one flaw in the W2, at least compared to the T1, is that it doesn't feel quite as solid and tight as I expected it to. There are some rattles, parts of the body look as if they would more easily dent or scratch, the display hinge is too loose, and its latch doesn't hold the display against the body as tightly as it should. In the same respect, the W2's display assembly doesn't have nearly as much flex as the T1's. That doesn't really matter because the W2 is not a Tablet PC where display spring can be very annoying. In fact, whereas you could get the T1 with atouchscreen, there is no such option for the W2—unusual for Panasonic which has been making more and more of its models available with touchscreens.

Traditional Toughbook buyer will undoubtedly have questions about the real-life toughness of the CF-W2. I sure that this is an aspect of the new ultra-light additions to

the Toughbook line that Panasonic marketing has given a lot of thought. It's important to realize that the CF-W2 is *not* a smaller, lighter version of the rugged CF-28. That's a role that the new CF-18 fills. Instead, the CF-W2 takes the Panasonic philosophy of providing more durable, more reliable computers into a new market segment. Anyone looking for a notebook that's ultra-light in size and weight but not in build and quality should take a look at the CF-W2. The T1 is a great little machine, but the addition of Centrino technology, a DVD/CD-RW drive, and a much more powerful battery make the speedy and completely silent CF-W2 a better and more complete computer.

Oh, and after watching that movie last night, leaving wireless on all the time, and writing this entire article on the W2, a total of five hours perhaps, the battery still shows 25% charge. Impressive. 



palmOne Shakes it up

Before the merge, market leader takes to ARMs

For only the second time in the company's history, Palm—I mean palmOne—announced three handhelds at once. They

range from the fast, high end wireless US\$400 color model to the US\$100 monochrome unit; all of the units, however, sport an ARM processor of one speed or another.

Starting with the Zire 21, the low end now has greater speed than any 160

x 160 monochrome Palm has ever had, due to its 126MHz TI OMAP processor. It also has 7.2MB RAM (on an 8MB chip). It runs PalmSource's latest OS, version 5.2.1. Externally, the Zire 21 is the same as the original Zire. Still no cradle, as the power and USB jacks are still on top. It's considerably more power in a light and uncomplicated package. The Zire 21 replaces the original Zire at the US\$99 price point.

Next is the new Tungsten E, a new design that appears to be aimed at fans of the legendary Palm V. It's simpler than the Tungsten T and C lines, in that it lacks wireless, and has no speaker. It also connects like the low-end Zires, which means there is no cradle available. Unlike the Zire and Zire 21, the two ports are at the bottom of the unit. Universal connector accessories and chargers, as

a result, will not work with the E. It does have a vibrant backlit 320 x 320 64K color TFT. It uses a 126MHz OMAP 311 processor. Its case is shiny metallic silver, and is a little wider than the other two introductions. It's a half inch thick, Palm's thinnest since the Palm V. A flip cover is included, as is an SD/SDIO slot. The five way navigator is also present. 28.8 of 32MB are available for programs, and quite a few are bundled with the device. Though there is no speaker for audio playback, there is a

3.5mm audio jack for headphones, and the RealOne player is bundled for playback of MP3s from an SD card. This will be a good basic Palm that does just what most users will want for a price that's more realistic as an organizer, US\$199.

Finally, what this reviewer has been waiting for: a Tungsten T with some teeth. The Tungsten T3. If you waited on buying that T2, rest assured you did the right thing. This was worth the wait. The T line is the power user's Palm, and all that power has more than doubled. Gather round, now. We're looking at a 400MHz Intel XScale processor with 52MB available on the 64MB RAM chip. But that's not all, because the screen is 50% bigger, offering twice the number of pixels that a Pocket PC does, at 320 x 480. The T's unique expansion mechanism reveals this extra 50% with a pull, and the Graffiti area is now virtual, meaning it can be moved out of the way to give programs more screen area.

There are many improvements in this device, including an enhanced Date Book, Contacts (yes, they changed the name from Address Book), and To Do List (these enhancements are also on the E); and a new status bar along the bottom. The status bar is always present, offering Home, Find, Menu, Clock, Alert, Bluetooth, Onscreen writing switch, Rotate switch, and Hide Graffiti area buttons, whether the slider is open or closed.

What's that? I thought you might notice that: you can indeed rotate the screen. Screen rotations are fast, allowing a better view of text, web pages, photographs, videos, and spreadsheets. The Kinoma Player, Documents to Go, and other applications have been enhanced to take advantage of the new display spec. Programs written to con-

form to the upcoming OS6 standards will also comply, according to palmOne's Anthony Armenta.

Other enhancements include changeable Graffiti area icons (just tap and hold to bring up a menu of eligible applications). Or tap and hold on the small house icon to bring up a list of the last six applications used. These are both permutations of Pocket PC ideas, but in the case of the latter list function, these six programs are not left running in the background like they are on the PPC.

The body is anodized aluminum and the unit

flares slightly top and bottom, looking a little more like the m500s that preceded the T. The slider is about as tight as was the T2, but the bottom body is a little longer, making the whole unit seem

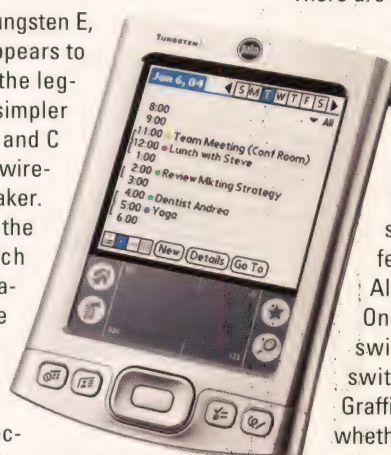
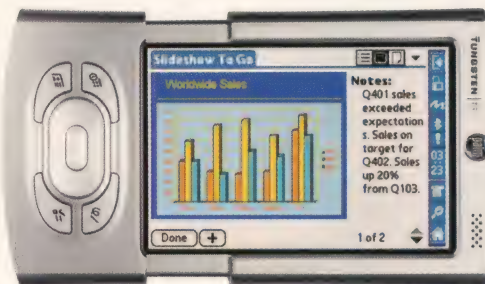
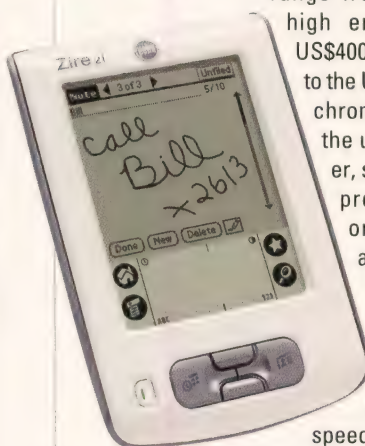
considerably longer when open; in reality it's only about an eighth of an inch. It's also a little slimmer than the original Tungsten T design. A leather flip cover that attaches at the back and flips over the top is included. I love flip covers. There's a door now covering the SD slot, a smart improvement that's indicative of how much finer this unit is than the already excellent T. "We did a lot of work this year," said Armenta. He's not kidding. We'll have to wait for a full review to see all the details.

The T3 is fast. Satisfyingly fast. It feels like a Palm from the future, not one debuting just a year from the original Tungsten T. I've only just begun exploring the new applications, but they offer some improvements that have been long overdue, others that are surprisingly novel. Most important is the ability to support multiple addresses in the Contacts list, meaning better sync with Outlook. Categories have also been introduced to the Date Book application, including colored dots next to each item so

users can differentiate them with a glance. Date Book databases can even be beamed to other users, allowing husband and wife or coworkers to share schedules, turning them on and off at will.

The T3 is a significant upgrade, offering the ultimate feature-set for Palm OS fans. The T3 is the tightest, smartest, most comprehensive improvement in Palm design in Palm OS history. This device is easily worth the US\$399 price tag. Enthusiasts rejoice.

www.palmone.com
—Shawn Barnett



Despite the lure of golf, all sessions were very well attended



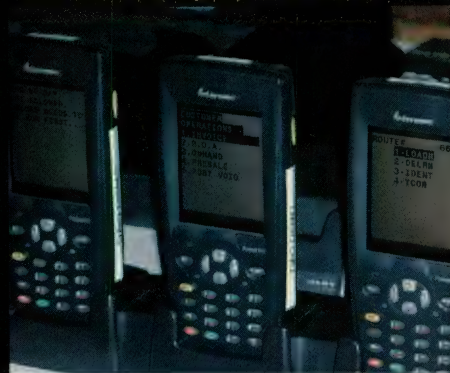
i-comm provided a great mix between sessions and exhibits



IBM's Adel Al-Saleh during his keynote presentation



Intermec's most successful product ever, the 700 Series



Pen Computing reports
on where the professionals
go to learn about the latest in
mobile technology

INTERMEC 2003 i-comm

—Conrad H. Blickenstorfer

Intermec cares about its customers

There is no better place to get a feel for a company and its products than at an annual user's conference. This year I attended Intermec's 2003 i-comm conference to see how the company had weathered the storms and where it is headed. i-comm 2003 took place May 4 through 7 at the gorgeous Doral Golf Resort in Miami, Florida. Intermec's company motto is "expect more," and those who came here with high expectations certainly were not disappointed.

Larry Brady, President and CEO of UNOVA, gave the welcoming address. Brady, an Annapolis US Naval Academy graduate and Harvard Business School MBA has an incredible command of economic and business terminology and used that to analyze and explain current economic conditions and their impact on corporate performance and growth in a stellar performance. In a half hour of well-crafted sentences and dense, yet eminently logical slides and visuals Brady analyzed the fall-off in manufacturing utilization in the year 2000, how it came about, and what needs to be done to reverse the trends. Explaining cause and impact of financial and economic phenomena over the past three years, Brady, despite the complexity of the data, made it all seem simple. He stated that Intermec's sales, despite the weak economy, have grown 13-16% in each of the last three quarters. Brady outlined new trends in capital expenditures, including a growing aversion to debt, an increase in outsourcing, and an emphasis on Return On Investment as a prime valuation criterion. In the 1990s, growth at all costs was accomplished via acquisitions, resulting in substantial debt. Looking into the future, how can business finance growth without greatly increasing assets? According to Brady, the secret is return on assets which largely depends on working capital asset efficiency, which means highly inventory turnover, which gets back to supply chain management, which happens to be Intermec's core strength.

This most excellent presentation was followed by a keynote by Adel Al-Saleh, General Manager of Global Wireless-Business at IBM on the new generation of wireless e-business. He said those who will succeed in this new economy will use unprecedented levels of integration to get on-demand performance. Wireless allows the capture of information at the place where it is created and passed on to where it is needed so that it can be processed and decisions can be made. Hence, wireless will be seen more not only in standalone or ancillary projects but more and more in core

business applications and in true CRM applications. He said that 65% of major enterprises will deploy at least one pervasive wireless application this year. This alone amounts to \$200 billion in business.

What followed over the next couple of days was a smorgasbord of breakout sessions and tracks. No fewer than seven competed for attendees' attention (in addition to the golf course and the pool!) and it was difficult to pick.

I learned more about Intermec's commitment to Bluetooth, the global wireless radio standard primarily meant to replace cables. Market research firm IDC predicts that two million Bluetooth devices will be in operation before the end of 2004. Intermec uses Bluetooth for communication with printers, GPS units, Wide Area LANs, scanning, and more. I saw how an Intermec handheld can discover and bond with a printer, a phone, or a scanner. I learned of Bluetooth security via PIN codes or turning off of discovery. My impression was that we are starting to see more Bluetooth standardization but that there are still a good number of steps to the process. The presenters listed Bluetooth's many advantages: it's inexpensive, there is an explosion of Bluetooth support, and you'll be able to do away with expensive, finicky cables.

"Feeding Hungry People using Intermec devices." The title of this session caught my eye because it is not something I would normally expect at a technology conference. Turns out that it was about the Gleaners Community Food Bank in Metro Detroit whose mission it is to collect and distribute food to agencies feeding the hungry. And the Food Bank is using Intermec equipment to handle and process all that food.

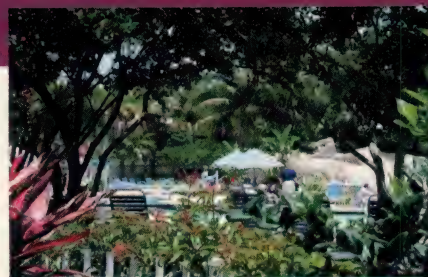
I felt this was a most heartwarming presentation that gave a technology company like Intermec a passionate, human face.

No industry gathering or conference would be complete without a product showcase. This year's i-comm Product Showcase took place in a giant tent and featured a much larger number of vendors than I expected. Pretty much everyone offering anything of value and interest to Intermec customers and developers, current and prospective, was present and accounted for.

At dinner I had a chance to mix and mingle with Intermec executives including CEO Brady who personally presented his views on the state of Intermec and various other issues.

On Tuesday, Intermec VP of Product Development, Dick Mahany stressed that "the focus is no longer on technology itself but on what people and

UNOVA President and CEO Larry Brady presents the welcome address



The Doral Golf Resort provided a wonderful venue for i-comm

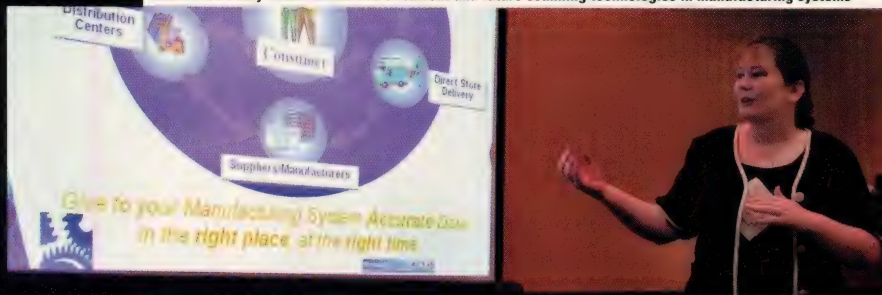


A chance to see all of Intermec's technology and applications

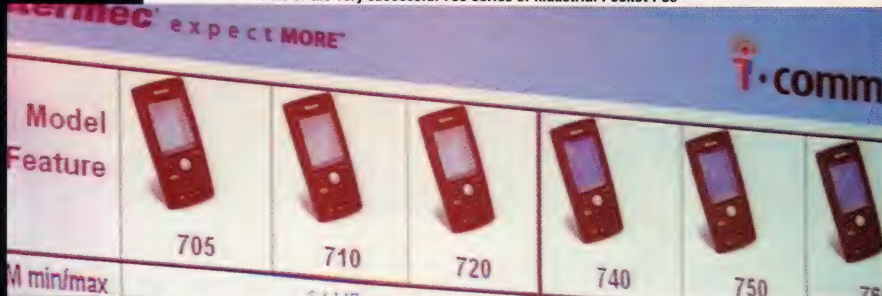


Much networking took place at the vendor show and exhibit

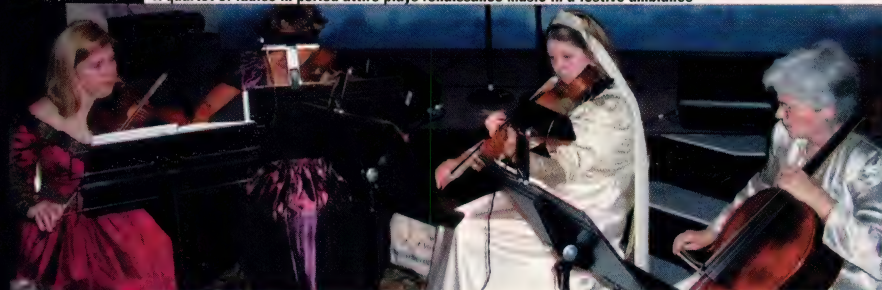
Intermec's Tracy Hillstrom the use of current and future scanning technologies in manufacturing systems



The different models of the very successful 700 Series of industrial Pocket PCs



A quartet of ladies in period attire plays renaissance music in a festive ambiance



companies can do with it. He then discussed all the practical applications of Intermec various technologies.

Tuesday brought four more rounds of seven competing breakout sessions. I learned how to select the best scanning technology, the scoop on Intermec's highly successful 700 Series of durable Pocket PCs, how the Social Security Administration did a successfully pilot with RFID tags, and advances in Voice over IP.

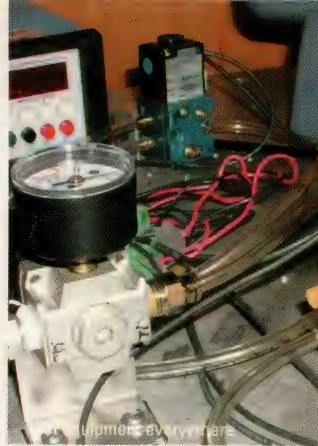
The final evening was "A Knight to Remember." And so it was. Yes "knight," not night. That's because the whole huge Doral Grand Ballroom was magically transformed into sort of a giant version of a mediaeval dinner hall. The entrance had a large gate with jesters and welcomers and guards. Inside, tables were arranged in long rows and adorned with tall silver chandeliers with 2-1/2 foot white candles.

Usually most people are gone by the last evening of an event, but that was definitely not the case at the Intermec Conference. This was a grand and elegant grand and very well attended affair. On the stage was a huge dragon with fearsome claws that spit up smoke every now and then, adding to the mysterious surroundings, Jubilant jesters and artists, all decked out in mediaeval garb, performed stunts and entertainment. A quartet of ladies in period attire played renaissance music.

Intermec did a super job with this conference. I won't forget it soon, and neither will the large crowd of customers, resellers, VARs, and developers who attended. Even in this electronic era of email, instant messaging, and the web there is a need for personal interaction and relationships. Intermec showed how it's done. 



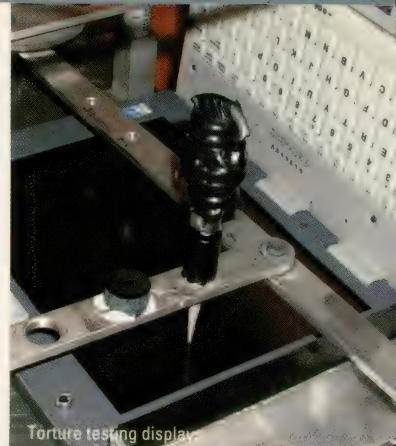
Matt Gerber and Marie Hartis, my hosts



Equipment everywhere



GoBook laptop



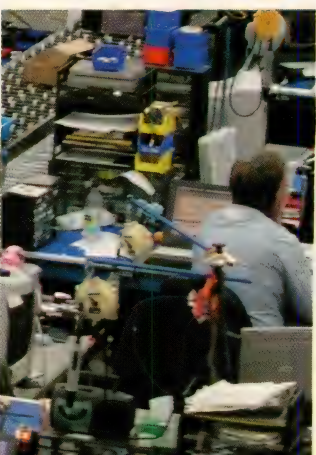
Torture testing display



Overview of the Liberty Lake manufacturing and service facility



CEO Tom Turner in his office





Board level repairs



And another shower

PROFILE Itronix

The making of Rugged Machines

We went to see how they are made

BY CONRAD H. BLICKENSTORFER

Itronix makes some of the best rugged handheld and notebook computers available and in July I had the pleasure of visiting the headquarters of Itronix in Spokane, Washington, to see how they do it. Itronix is the maker of the GoBook family of ruggedized and wireless computers and handhelds. Their specialty is hardened notebooks where they compete head-on with Panasonic for the lead in many markets. Itronix's major products are the GoBook (rugged standard performance), the GoBook II (rugged high performance), the ultra rugged GoBook Max, the new GoBook Tablet PC, the fex21 handheld, and a few flashlight-style handheld terminals.

Itronix's success is all the more remarkable given that through no fault of its own, the company had found itself in a precarious position when former parent Acterna, previously known as Dynatech and the world's largest provider of test solutions for optical transport and Cable networks, hit financial trouble. Acquisitions, restructurings, and a bad market in telecommunications testing drove Acterna stock down from the \$40 range in 2000 to just a few cents. Itronix thus faced a good many problems and challenges. The uncertainty of its parent. Price pressure due to lower cost Tablet PCs and handhelds. An iffy economy. And major competitors, such as Panasonic, that are much better financed. Yet Itronix seemed to prosper and there was much optimism within its ranks. This summer things turned for the better when several Acterna businesses and divisions were sold, among them Itronix which is now a separate, privately held company.

Itronix started as an adjunct to Spokane-based Itron, spent some time under Telxon, became independent again, acquired UK-based Husky and

became part of Acterna. With utility sector sales low due to energy price spikes and deregulation strains, Itronix profited from good gains in other markets like insurance, government and military. Even while its parent stumbled, Itronix revenue grew from 130 to over 150 million in 2002 and the company has been profitable the last three years. Assuming an average per unit price of \$4,000 including services, those sales number suggest 30-40,000 units per year (our estimate). Overall worldwide employment currently is about at about 400.

Perhaps representative of the tenacity and vision of the people in this amazing town along the Western border of Idaho, is the historic Davenport Hotel I stayed in. It was built in 1914, visited by many presidents and dignitaries, and beautifully renovated to the tune of \$33 millions just a year ago. The Davenport is stunning and instantly transports you from the realities of today's downtown Spokane to an earlier time. Period photographs show the way thing used to be. The Davenport, as the indomitable spirit of the people of Spokane, has not changed.

I had dinner at a wonderful restaurant in a converted mill with Itronix VP of Worldwide Marketing Matt Gerber, Director of Marketing Communication Marie Hartis, and Itronix President and CEO Thomas E. Turner. Turner has been Itronix CEO since February 2002. Before that he headed Wherenet Real Time Location Systems, and had positions at bar code supplier Datamax, Symbol as Senior VP, and at Wang. Like many CEOs, Turner has an easy smile, friendly demeanor, and is a pleasure to talk to. Having just come back from a weeklong vacation in Hawaii, he was quite relaxed for a man in charge of transitioning his company from a division of a troubled conglomerate to an independent entity. Turner said he hoped the transition would be completed by the end of the year (the sale actually was completed by the end of September). The Acterna situation, he stated, was a challenge with potential new accounts,



PROFILE Itronix

but also said that the company has been quite successful with new sales, especially with the new GoBook II. About 75% of Itronix's sales come from hardware and the other 25% from services, integration and software. Unlike some of the competition, much of Itronix's sales activity is directly via the company. VP Gerber said they sold close to 50,000 units in 2002. Like most US computer companies these days, Itronix is a designer, manufacturer, marketer, but does not build everything themselves. Like many of the world's top tier laptop computer manufacturers, the Itronix designed boards and chassis are manufactured to Itronix specifications by overseas contract manufacturers like Twinhead and USI. This allows Itronix to optimize production efficiencies and costs, yet still control all aspects of the products' functionality and quality.

CEO Turner elaborated on their new Twinhead-built tablet and how customers will use the Windows XP Tablet PC Edition. He talked about the possibility of a GoBook Max with a convertible display. Turner liked the idea, but felt that with multiple radios and many other electric connections going through such a hinge, there are substantial reliability questions.

While enjoying a longtime, close relationship with Twinhead that builds the notebooks as well as the Q100 handheld computer to Itronix specifications, Itronix also works with another Taiwanese specialist, Universal Scientific Industrial Company (USI) of Taiwan, that builds the fex21 handheld PC. This however, stressed Turner, is not a case of his company simply shopping for a product to put their label on. Instead, all specifications are jointly worked out by both companies.

The next day I did a factory tour. Itronix has a laptop group, a handheld group, and a wireless group. I met with representatives of all three and saw their teams at work. Or rather, I saw a large maze of cubicles each occupied by an engineer busily working behind those five-foot tall partitions. In Japan and Taiwan, the partitions are lower or non-existent. You can see everyone at their tables and desks. Two different styles, same result.

I was amazed at the very extensive Pro/ENGINEER computer modeling they employed to design and analyze every last aspect of every product. In general, it seems that while Itronix's Taiwanese partners concentrate on the electronics, the housing, all ruggedness aspects, and the wireless systems are designed and tested in Spokane. Sometimes design respon-



Liberty Lake facility



sibilities overlap. Itronix, for example, came up with thermal management designs and the high tech solutions used in the GoBook II's display heater. Due to intellectual property issues some technologies are simply not available outside of the United States.

Each of Itronix' groups faces different problems. Environmental challenges, for example, are very different for handhelds than they are for laptops. Handhelds have smaller displays and no hard disks. They can survive higher drops but properly sealing handhelds is difficult. The handheld group also does a lot more of the overall and electronic design because Taiwan is not yet as experienced with handhelds as they are with notebooks. Since almost every large Itronix customer has different requirements, the handheld group views itself as a provider of "semi-custom" products.

Radio frequency sealing is always a challenge with computers, and especially so with compact designs that may include more than one radio. Like other manufacturers I visited over the years, Itronix has its own sophisticated radio testing lab with plenty of equipment to optimize all components and finding the best performing antennas. Inhouse testing is done to minimize costs by increasing the chance of passing externally performed FCC certifications. "We make sure they pass," said the manager of the radio lab with pride. I asked about their view of Bluetooth. Not a big issue for them as of yet, but they

did some tests and there's concern over lower throughput. New products like the next rev of the Q100 "Magnum" handheld will have Bluetooth.

No rugged computer facility would be complete without an environmental testing lab with specialized tools and equipment. One lab group prepares machines for qualification and analyzes failures after tests. The testing lab itself, the torture chamber, subjects computers to temperature extremes, shock, moisture, humidity, stress and just about anything else that an Itronix device might encounter on the job. I saw drop tests of the new Tablet PC and rain tests where a GoBook was subjected to prolonged water showers.

In addition to the labs, Itronix has a 56,000 sqft client services, manufacturing, and repair facility in Liberty Lake, a few miles outside of Spokane.



The Q1000 handheld computer

High quality client service is essential to Itronix as it accounts for about 25% of overall revenue. A seller of solutions rather than just hardware, the client services group usually comes in early in the sales process with consulting, implementation support prior, during and after a sale. There's a sophisticated help desk and general technical support system. Itronix' largest clients, such as Sears, have their own help desk sections. Help desk support is tiered. First tier support clients call the Itronix help desk directly. Second tier means they call someone within their own organization first. If that results in no answer, that person then consults with Itronix. Third and fourth tier add one or two more levels. I learned that Itronix receives an average of about 150 calls a day for their Sears account with its 13,000 technicians who use Itronix equipment.

Another area of client services is what Itronix calls their Asset Maximization Program. The goal here is to attempt to help customers get the most of their investment. Itronix tracks client experiences and problems, compiles and analyzes them, and then suggests the proper course of action. The result of such an analysis could be a recommendation for additional training, a different configuration, or perhaps the use of different equipment.

I then toured every part of the manufacturing shop floor. The Liberty Lake facility is new, clean, airy and generally a nice, friendly place. Despite the staggering amount of electronic equipment, tools, supplies, stock, workbenches and such, it looks like a place where people work and not robots. Most workstations are somehow personalized. There are pictures of babies and loved ones, plus an assortment of all the artifacts that people like to bring to work. Everyone's busy working but there's a bit of joking and talking going on. These people like it here. And they certainly know what they are doing.

The vast shop floor is organized into different sections. Part is for assembly of new machines, part for service and repairs, part for packaging and shipping, and part—enclosed in a chainlink fence—is dedicated client asset management space.

The bottom of a new Itronix notebook carries a sticker that says "Assembled in the US from domestic and foreign parts." Although Itronix does not directly manufacture its design for the housing and motherboards, they play a pivotal role in the final product assembly, including configuration, wireless integration and testing. They receive partially assembled product that are then built up to each client's requirement. The bare notebook chassis from Taiwan have no keyboards, no disk, no memory, no radio, no cradle contacts, and sometimes no displays either. Itronix's own assembly line adds wiring, adds components, installs the disk, memory, and may

change the CPU. Each installed component is bar coded and added to the unit's master sheet for tracking and the finding of problem areas.

Once assembled, each unit goes through a battery of hardware and system level software tests. A liquid nitrogen cooled HASS (Highly Accelerated Stress Screening) chamber tests functionality of the unit under extreme conditions and provides specific diagnostics on key operations. If stress chamber failure rates rise above 2%, every single unit produced goes through the chamber until the problem is found and fixed. Once failure rates return to normal, statistical sampling resumes. Next, the machines go to software loading where disk images are burned according to customer specifications and the machine's equipment and configuration. The software is tested and the machines gets audited for strict hardware and software compliance. Packaging comes next, and there instead of cardboard supporting structures Itronix uses an interesting foam molding process. A square piece of thin plastic contains chemicals that foam up when activated. The computer is placed onto the foam cushion which shapes itself around the machine. This packaging is bio-degradable and provides superb protection. After a box is packed and sealed it is weighed again and the value compared to what it is supposed to be. This is a final test to make sure the system contains everything it is supposed to.

Hardware service and repair is done in this same facility. Units returning for service are scanned and then disassembled to varying degrees. Handles, cases, covers and other parts are cleaned, some in innovative and unique ways. The facility is equipped to do board level repairs, primarily on boards that were built by Itronix itself. GoBook boards may be repaired or replaced, some sent to the Taiwan repair facility. The Liberty Lake facility also does systems upgrades.

Itronix feels that having manufacturing and repair/service together is an advantage as it provides immediate feedback. The plant sees what



goes wrong and can take corrective action. Workers see where to take special care and managers can provide feedback to their Taiwanese and other suppliers. Turn-around is 48 hours, though customers may sign up for special programs where replacements are sent out before the faulty one is sent back.

A fenced-in Asset Management Area is basically a client warehouse for client stock and equipment located directly at Itronix. This allows large customers to keep equipment at a place where it can easily be replaced, repaired, and tracked.

I was left with the impression of a company that seemed remarkably unperturbed and unaffected by the struggles of its former parent. Offices, labs, and shop floors are bustling with activity and wherever you look there's a sense of pride and optimism. That optimism seems present at all levels, from CEO Turner's confident steering of the company all the way to the workers who clean parts and pack finished product into boxes.

As I left I pondered the different ways companies go about achieving their goals. Like Panasonic, Itronix sells ruggedized notebooks, and they compete in many of the same markets. But their approach is very different. While Panasonic combines the resources of an industrial giant, Matsushita Electric, with skillful global management to focus on their chosen markets, Itronix relies on well oiled, well managed partnerships with best-in-class component and other vendors to provide their customers with competitive products. Different method, same result. 



Fujitsu Stylistic ST4000 with Reflective Display

The Fujitsu Stylistic 4000 needs little introduction. Unlike much of its Tablet PC competition, Fujitsu has been building and selling pen slates for over a decade. While others are still working out the bugs, the ST4000 is built on the experience gained from at least a dozen generations of pen systems. We initially reviewed the ST4000 in our December 2002 issue and found it "the elegant, polished, professional Tablet PC device we expected from Fujitsu," and proclaimed it "an excellent choice all around, and especially for those who want a tried and true solution."

Now there's another reason to pick the ST4000 over the competition. It is the first Tablet PC to be offered with a reflective front light display. Depending on what you use the computer for, screen technology makes a huge difference.

So far, Tablet PCs have offered little choice in the display area. Most have 10.4-inch transmissive LCDs with XGA (1024 x 768) resolution. A few have 12.1-inch transmissive LCDs, also with XGA resolution. Those screens are razor-sharp and very bright indoors, but almost unreadable outdoors. Some have anti-reflective coating which increases readability a bit, but not by much.

For those who need outdoor readability, some vendors offer optional transreflective displays. Those combine transmissive and reflective technologies by being part transmissive and part transreflective, thus offering a compromise. They are quite readable outdoors, but have somewhat less contrast than pure reflective displays. Indoors they come close to transmissive displays, but cannot quite match them.

The transreflective compromise is acceptable to many customers who need to use their computers indoors. Transreflective LCDs have pretty much replaced transmissive and reflective displays in PDAs both in the Palm OS devices and in Pocket PCs.

One problem with transreflective displays is that they generally have lower resolution than transmissive or reflective LCDs of the same size. That's because of the mechanical limitations of the transreflective mask which reflects some light and lets some pass through tiny holes. At this point, no one offers a 1024 x 768 transreflective display and customers are limited to 800 x 600 pixel SVGA resolution—very marginal for today's graphics-intensive windowing systems and applications.

reflective displays but quickly abandoned them because they were nearly unreadable indoors and totally unreadable in poor lighting. So what solution did Fujitsu come up with?

They used a reflective display with front lighting, which is the same technology that caused a revolution in Pocket PC design when Compaq first had it in the original iPAQ. The idea here is to place a fluorescent light source alongside one edge of the screen. That light then illuminates the front of the reflective display when indoors. This works quite well and a couple of years ago, almost all Pocket PCs used sidelit reflective displays. However, there are a few problems with sidelit reflective LCDs. One is the strong fluorescent glare of the light source when you look at the screen from an angle. A second is a set of sharp shadows emanating from each end of the light source when viewed from certain angles. Finally, since there is a gap between the protective glass and the surface of the LCD, sealing becomes an issue. Many early iPAQ users complained of annoying dust particles accumulating under the glass of their displays. For these reasons, in PDAs sidelit reflective displays have since largely been replaced by transreflective screens.

Still, sidelit-reflective displays work, so given the inherent shortcomings of transmissive designs and the compromises of transreflective screens for outdoor viewing, why haven't we seen them in notebooks and tablets until now? One reason is that few LCD makers are willing to set up production lines for low volume screen sizes, and despite the emergence of Tablet PCs, 10.4-inches is in that category. Another reason was that sidelighting supposedly didn't scale well to larger screen sizes where it would result in uneven display illumination. We therefore had no idea what to expect from the sidelit 10.4-inch display now available in the Stylistic ST4000.

The answer is that the display is much, much better than we expected.

Indoors, the display is eminently readable. It's not on par with a transmissive notebook LCD, but completely acceptable.

Think of a much larger first generation iPAQ display. When you look at the display at an angle from the right side you see the strong backlight, but it is recessed under the bezel far enough not to be too intrusive. At an angle you see the two dark shadow bars typical of this type of display, but again, they are not intrusive. Unfortunately, the display isn't very sharp. It looks as if a slight Gaussian blur had been imposed over the entire surface. This is most noticeable when the ST4000 sits next to a standard transmissive display. Another slightly annoying thing is the parallax caused by the air-space enhanced distance between the pen and the surface of the LCD (see below). This requires some getting used to.



Outdoors is where this display really shines. Just like those early iPAQs, the ST4000's display is vibrant and full of contrast outdoors, and becomes even more so in direct sunlight. Its clarity is far superior to any transreflective display I've seen. You can take this machine from brightest sunlight into complete darkness and it remains perfectly, beautifully readable under any and all lighting conditions. Amazing!

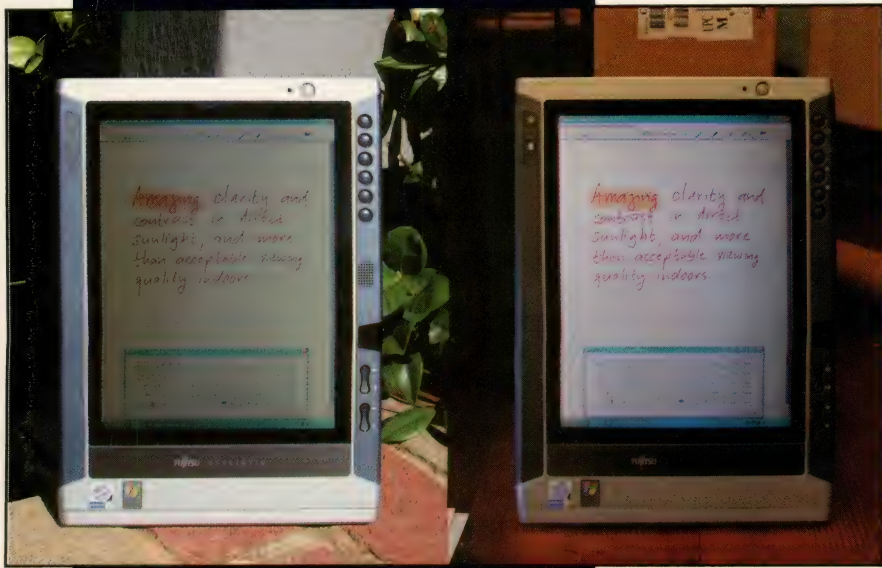
So much for the display. Now what about the rest of the Stylistic? It remains an elegant, handy 8.7 x 11.9 inch slate, less than an inch thick and weighing just 3.2 pounds. Our review model was powered by a 933MHz Ultra Low Voltage Pentium III processor that provided good performance, but also generated quite a bit of heat and kept the relatively loud fan going most of the time. We liked the handy IR keyboard that reliably worked even from five or six feet away. We also liked the ST4000's form-fitting padded case and the overall layout and design of the unit. The black glass bezel around the 10.4-inch display makes it look larger than it is. The dock lets you use the unit both in portrait and in landscape mode, and it includes an optical drive. It's a big bulky, though less so than earlier Fujitsu docks. At some point we hope to see a Centrino implementation.

As is, if you need a true indoor/outdoor Tablet PC slate, the Fujitsu Stylistic ST4000 is it, and starting at US\$2,199 it's just \$200 more than the transmissive model. An excellent deal.

www.fujitsupc.com

FINALLY!
A display that is as
easily readable
indoors as outdoors

ST4000 in bright sunlight (left) and indoors (right). Both pictures, from Olympus C5050, completely unmodified.



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PenLab: Panasonic Toughbook 73

Your standard full-function corporate notebook, only a lot tougher

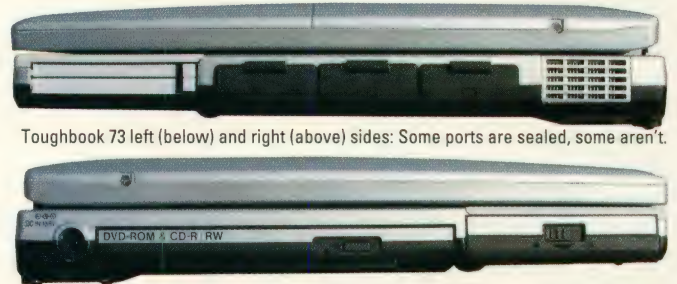
by Conrad H. Blickenstorfer

Notebook computers are becoming ever more popular and have begun to replace desktop PCs in many places. That's because notebooks offers almost everything a desktop does, from fast processors to huge hard disks to a smorgasbord of available optical drives and displays

That would be reliability and the cost of repair. Packing all that power and all those features into a box a fraction of the size of a desktop doesn't only result in the higher price, it also means lightweight construction, very dense packaging, and dealing with heat dissipation and proper sealing. All that would be quite a

challenge for a stationary product, but notebooks are carried around and frequently take a beating. As a result, they break much more often than desktops. And they are very costly to repair.

Panasonic recognized all that early on and, with its Toughbook line of ruggedized notebook computers, has built an entire business around this niche. Initially the



Toughbook 73 left (below) and right (above) sides: Some ports are sealed, some aren't.

ures and electronics. The target market for those Toughbook models are not utilities or the military and such, but regular office workers and road warriors who are tired of having their notebooks break, and purchasing managers who are sick of the resulting high repair costs.

The challenges in designing and building a durable notebook for that market are quite daunting. Unlike industrial markets where ruggedness comes first and weight and state-of-the-art electronics and components second, business customers are not willing to give up the features and performance they have come to expect from standard notebooks.

They want a large display, all the latest features, and they want it all in a sleek and slender package that doesn't weigh a lot or cost a fortune.

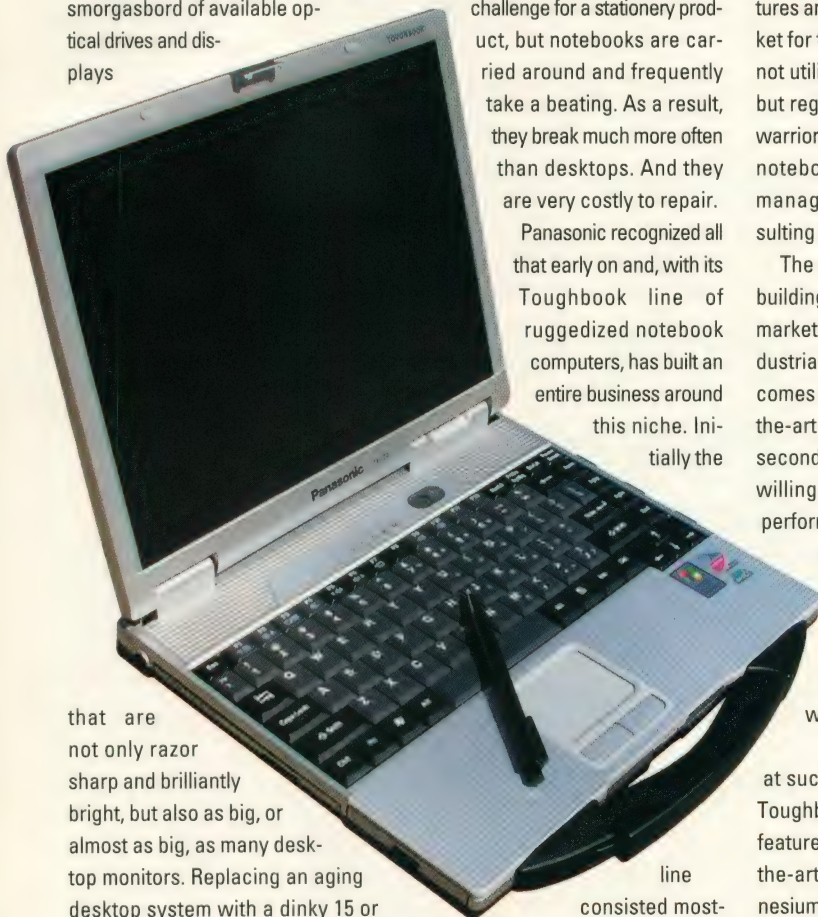
Panasonic's first attempt at such a hybrid machine was the Toughbook 72 which packed all the features of a contemporary state-of-the-art notebook into a tough magnesium housing. Initially built around a Pentium III processor and then switching to a 1.8GHz Pentium 4, the 72 was, and is, a formidable machine. It is, however, also a rather heavy one, weighing over seven pounds. That's not excessive considering that early notebooks weighed two or three times that much, and that many non-ruggedized full-featured notebooks weigh about the same, but on the road

every extra pound is being felt, and that's where the 72 fell short of some people's needs.

Enter the new Toughbook 73. Unlike the 72 which looked like a larger, sleeker version of the company's perennial bestseller, the rugged CF28, mimicking that model's look and design features, the 73 has a style of its own. It's mostly made of Panasonic's trademark magnesium, of course, but its black and silver housing has a unique look with design features reminiscent more of the ultra-light R1 and T1 than the rugged siblings of the Toughbook house. At 11.7 inches, the Toughbook 73 is as wide as the 72, and its depth of 11 inches is just half an inch less. It's not much thinner either (1.5 versus 1.7 inches), but somehow Panasonic managed to trim off 2.2 pounds compared to the older model. That leaves the 73 at just under five pounds. Still not ultra-light, but definitely manageable.

Some of the weight savings come via a noticeably lighter construction. The Apple Powerbook-esque wrist-rest in front of the keyboard, for example, is plastic. The display case, rock-solid in the 72, is thinner and has some torsional flex, and the display hinges are definitely thinner. That's not to say, however, that Panasonic has skimmed. All in all, the Toughbook 72 feels very solid, reliable and trust-inspiring.

Under the hood we find not a hulk-



that are not only razor sharp and brilliantly bright, but also as big, or almost as big, as many desktop monitors. Replacing an aging desktop system with a dinky 15 or even 17-inch CRT with a sleek new notebook with a 14 or 15 inch LCD seems almost a no-brainer. And while notebooks continue to cost a bit more than desktops, the prices of all computers have come down so much that even high-end notebooks seem like a bargain. So, apart from cost, what's still keeping people from replacing desktops with notebooks?

line consisted mostly of heavily ruggedized models for use in harsh environments, but in recent years the company has been offering lighter duty models as well, basically standard notebooks in tougher shells. Or in other words, notebooks where as much thought went into designing a housing and body that would hold up to daily use and abuse as time was spent on fea-

SPECIFICATIONS

Type	Ruggedized notebook computer
Processor	1.4GHz Intel Pentium M processor with Intel 855GM chipset
OS	Microsoft Windows 2000 or XP
Communication	10/100base-T, 56K V.92 Modem, internal 802.11b wireless LAN radio
Memory	256MB - 1024MB PC2100 DDR SDRAM, 1 extra slot
Storage/drives	40 GB hard disk • internal DVD-CR-RW optical drive
Slots	2 PC Card Type II or 1 PC Card Type III
Display/digitizer	13.3" XGA (1024 x 768) TFT/capacitive touchscreen
Keyboard/pen(s)	full-scale keyboard • 1 pen
Dimensions/weight	11.7" x 10.0" x 1.5" • 4.9 pounds including battery
Housing	Magnesium
Power	42 watt-hour Li-Ion ("3.5 to 5.5 hours")
Interface	2 USB 2.0, audio/mic, RJ-11, RJ-45, VGA, IO box, dock, Bluetooth opt.
Price	US\$4,000 range

ing Pentium 4 but Intel's new Centrino technology, consisting here of a 1.4 GHz Pentium M processor, the 855 support circuitry, and Intel's Pro/Wireless 2100 802.11b network connection. This is clearly a more energy-efficient setup than that of the 72. Combine the miserly processor with a beefy 42Watt-Hour Lithium-Ion battery pack (roughly the same as the 72) and you get estimated battery life of 3.5 to 5.5 hours compared to the 2.5 hours max of the heavier 72. And if that's not enough, you can replace the DVD/CD-RW drive in the media bay with a second battery pack.

On the features front there is more good news. The 73 has a very nice 13.3-inch XGA display whose anti-reflective coating provides decent outdoor readability. Despite a touchscreen overlay, the display is bright and offers very good contrast. Standard

memory is 256 or 512MB of PC-2100 DDR SDRAM, upgradeable to 768MB or 1GB. There is a 40GB hard disk and a DVD-ROM/CD-RW combo drive. On the right side are two USB 2.0 ports, a serial port, and a video port. Each has its own flexible rubber plug. There is also a non-protected dual PC Card Type II slot. The backside features an "IO Box" connector that can add serial/parallel/PS2 ports via optional cables, an RJ45 LAN connector, a RJ11 jack for the internal 56K V.92 modem, all with their own rubber plugs, plus the audio in and out jacks. On the left you'll find the optical drive and the hard disk compartment. The bottom, finally, has a 80-pin port replicator connector for those who want a full complement of full-size connectors and ports. There are no controls along the front, and that

is primarily because almost the entire length is taken

up by big and elegantly engineered carry handle. As nice as the handle is, it does add an inch and a quarter in depth and some weight, and some people may find it gets in the way. If you're among them, simply unscrew it and take it off.

The gray and black plastic keys of the full-size keyboard offers good tactile feedback, but they are loosely mounted on their individual switches and thus rattle a bit too much for my taste. The disk is silent, with none of the annoying clicking sounds that we occasionally notice in notebooks. The fan, too, is very quiet. Despite the fan, however, and despite the good heat dissipation properties of magnesium and the miserly Centrino technology, the 73 still gets pretty hot.

Since it does not have an active digitizer, the Toughbook 73 cannot run the XP Tablet PC Edition. Instead, ours came Windows 2000—a good match for this machine. Standard Windows XP is also available. Panasonic packages a basic black plastic Pilot pen with the 73. There is no garage for it, so you must carry it in your shirt pocket or purse. I must say that even after having spent a lot of time with the active digitizers on tablet PCs, I still appreciate a good touchscreen. You can't move the cursor around by hovering the pen above

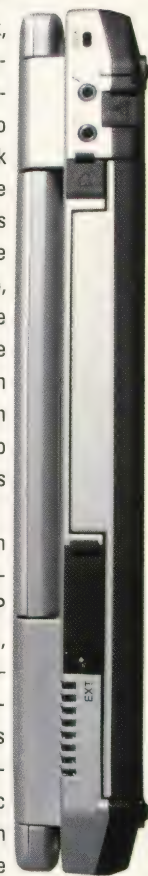
the screen as you can on a Tablet PC, but the touchscreen is far more precise along the edges, and if you lose pen, no big deal. You can still use your fingers or the capacitive touchpad.

Life with the Toughbook 73 is easy. It has no quirks or weird things to get used to. It's also fast, quiet, and it does everything I need for a modern notebook to do. It also feels substantially more durable than your garden-variety standard notebook. I must say, though, that I'd order the Tough-Mate Universal Carrying Case with it. That's because while I have no doubt about the magnesium case's toughness, the beautiful silver and black finish *looks* like it would scratch easily. I didn't put that to the test, but I just can't get rid of the feeling that the 73's immaculately perfect power

finish is more vulnerable to cosmetic damage than the pedestrian gray plastic of some econonotebook. Another interesting behavioral issue is that this Toughbook often leaves you wondering just how much abuse it can take. It's magnesium and all, and has rubber plugs on most ports, but other areas seem open and exposed. It's not obvious whether they are sealed, somehow, inside, and so using the Toughbook under iffy environmental conditions is a bit like not knowing just how far offroad you should go with your shiny new 4-wheel-drive SUV.

Then there is the price. We're talking just over \$4,000 here, and that is not cheap. The purchase of a Toughbook 73, or a boatload of them, clearly is a bottomline question. It does everything a modern notebook can do and from the looks of it, it will last a good long time. If its heavier-duty construction

and the vast experience Panasonic has gained over a decade of building Toughbooks statistically reduce the failure rate over its lifetime, then buying this wonderful machine may actually be a bargain.  www.panasonic.com



PenLab: Panasonic Toughbook 18

Matsushita's first Tablet PC—Compact rugged notebook with a twist

by Conrad H. Blickenstorfer

The Toughbook CF18 is Panasonic's first entry into the Tablet PC arena. The CF18 is a very compact notebook convertible running the Windows XP Tablet PC Edition on Intel's Centrino chipset. Since it is a convertible you can use it as a standard notebook or, by rotating and flipping the display, as a tablet. But if you'd think this is just another rugged notebook, you'd be wrong. It's another rugged Toughbook, and one with a twist.

That the CF18 is a member of the Toughbook family is immediately obvious by its design and choice of materials and surface treatment. Like all other Toughbooks, this one is made almost entirely of magnesium. And like all Toughbooks, it is not only made of magnesium, it *flaunts* that it is made of magnesium. There's probably no one that does magnesium better than the Matsushita Electric engineers in Osaka and Kobe, Japan.

The CF18 is ruggedly handsome in sort of a Hummer 2 way—smaller than the big Toughbook 28, but just as bodaciously, boldly rugged and don't you forget it. Using black and silver with different surface treatments, from smooth all the way to a rough

powder finish, the CF18 shows off Matsushita's superior expertise with magnesium to the max. It is hard to imagine a better looking machine, or one that's more trust-inspiring, and equally hard to imagine one that shows more attention to detail. Things that need to be screwed down are screwed down and you can see the screws. Parts that need to be covered are covered and you can see the mechanism and how it works. For aficionados of craftsmanship and fine machinery, even touching the CF18 is a treat. It makes you feel like when you move your hands along the lines of a fine automobile or when you pick up an expensive, high quality tool.

I saw the CF18 for the first time at a meeting with Panasonic management in Kobe in early summer of 2002 when it was just a design study, albeit one with a remarkable degree of polish. I fell in love with it then and hoped Panasonic would make it a real Tablet PC as opposed to just a notebook with a touchscreen. They did, and much more. The initial prototypes that came in at six or seven pounds were deemed too heavy and the engineers were sent back to the drawing board to trim a couple of pounds.

They did better than that. Despite its rugged construction, the CF18 weighs just 4.4 pounds, barely more than a civilian duty Toshiba Portege Tablet PC convertible. During that meeting I noticed Panasonic's great attention to detail, down to reflectivity, durability, and resistance properties of certain surface treatments and how they affect the overall design. Or how engineers agonize over the right combination of the right materials for optimal shock absorption. From the look and feel of it, all of those principles and discoveries made it into the CF18.

Being a notebook convertible, the CF18 has the twist-and-flip display hinge first seen in modern times on the Acer Travelmate C100 Tablet PC. The same design has since been used by Toshiba, Sharp, and Fujitsu. The display rotates 180 degrees clockwise until it faces away from the keyboard and is then folded flat with the LCD side now facing up. The notebook becomes pen slate, albeit one that's thicker than a standard slate. The twist display is an elegant solution, but as implemented by Acer and Toshiba it had one significant drawback: Tapping the display part of those machines with the pen results in a

very annoying springy flexing. You actually have to steady the display with one hand in order to make pen taps and double taps work. I am happy to report that the CF18's sturdier hinge eliminates virtually all of that flexing. Sounds like a minor thing, but as any pen-using Portege owner will attest, it is not.

A few more aspects of the CF18's display need mentioning.

First, there is a snap lock at the base of display hinge. It serves a similar purpose to the locks on either side of the Acer C100's display, to not allow the display to twist if you don't want it to. Not a bad idea. However, the CF18's display still moves a degree or two even when it's locked, making it the only part of this machine that doesn't feel rocksolid.

Second, the screen lock that tightly secures the display against the keyboard part of the CF18 with the screen facing either up or down is a shining example of great industrial design. It's made of magnesium, of course, and it's hard to imagine a better or more effective solution.

Third, the two screws on the top left and right of the display aren't just there for good looks. They neatly fit

The Panasonic Toughbook 18 can be used either as a notebook or as a tablet thanks to its rotating swivel hinge. Heavy-duty hinge design eliminates annoying flexing of the display.



SPECIFICATIONS

Type	Compact notebook convertible
Processor	900 MHz Intel Pentium M with Intel 855GM chipset
OS	Microsoft Windows XP Tablet PC Edition
Communication	10/100base-T, 56K V.90 Modem, internal 802.11b wireless LAN radio
Memory	256MB base upgradeable to 768MB DDR SDRAM in one slot
Storage/drives	Shock mounted 40 GB hard disk • external USB DVD/CRD-RW drive
Slots	2 PC Card Type II/1 Type III
Display/digitizer	10.4" XGA (1024x768) transmissive TFT/WACOM
Keyboard/pen(s)	Built-in 91%-scale keyboard • 1 Wacom Slim pen
Dimensions/weight	10.7" x 8.5" x 1.9" • 4.4 pounds
Housing/IP Rating	Magnesium
Power	49 WattHour (7.4V, 6.6Ah) Lithium-Ion ("4-6 hrs")
Interface	2 USB Type II, RJ11, RJ45, audio in/out, video, speaker
Price	US\$4,000 range



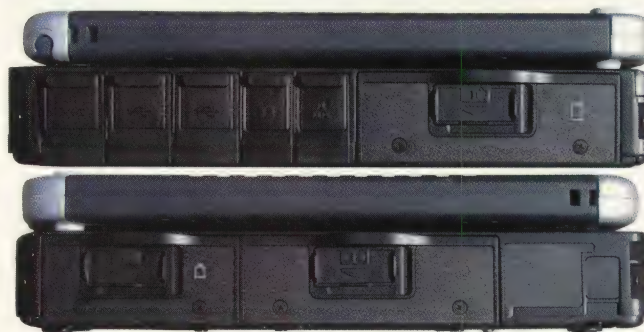
into "female" screwheads on the body of the CF18 so that the display doesn't move at all when locked down, LCD facing up or down.

Finally, anyone who has been dismayed by the glassy smooth surface of every other Tablet PC on the market today will immediately love the CF18's screen. You can't see it, but the glass is etched and feels remarkably different and much more like real paper. There's even a slight scratchy sound when you write on it. Another small thing, but one that can make a huge difference.

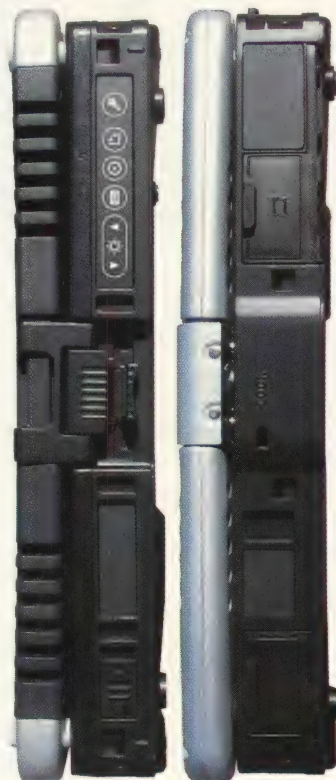
And the 10.4-inch display itself is as sharp and bright and contrasty as they come. Like most current Tablet PC displays it uses transmissive technology, but a special anti-reflective coating provides a decent degree of outdoor readability. Like most current Tablet PCs, the CF18 has a Wacom digitizer which needs a special pen. Building a garage for a full-size pen into a compact notebook is always a difficult task, and so Matsushita's engineers opted for Wacom's "Slim pen" that's the size of a PDA stylus (and also costs just \$19.95 from Wacom, ten dollars less than the basic full size pen). The little thing neatly fits into a garage at the bottom of the display. One unanswered question is how Panasonic's traditional field force customers will take to this tiny pen that can be hard to hold and easy to lose. That, of course, is why Panasonic also offers the CF18 with a standard touchscreen and plain vanilla Windows 2000 or XP.

Apart from the extensive use of

Side views show that all ports, bays, and connectors are individually sealed.



magnesium, what makes the CF18 suitable for duty in hostile environments? The touchpad and keyboard are moisture and dust resistant, of course, but what we appreciate most is that every single port is individually sealed with a tough plastic cov-



er that's attached to the body of the CF18 so you won't lose it. If you need to use one USB port, all you do is open that one plug. That's a big difference from many rugged devices that protect a whole row of ports behind one single sealed door. If that one is open, all ports are exposed. Not so on the CF18. Very clever. There are other interesting design solutions such as the 3x3 inch cover of the internal RAM expansion slot. Panasonic built a comparatively massive 3-inch diameter speaker into that cover. It's facing down and protrudes from the flat underbelly.

The same kind of novel and innovative thinking also went into designing protection for the CF18's other openings, those being the battery bay, the hard disk compartment, and the dual PC Card Type II slot. Each has a flush-mounted cover with a rubber seal that is secured with a latch that must first be moved to the right and then pulled down. There is not a chance that this will ever happen accidentally. On the other hand, I don't really see a need for frequent access to the hard disk so I probably would have opted for a screwed down compartment door. As for a

list of all those

individually sealed ports: we have two USB Type 2, RJ11 and RJ45, audio in/out, and video.

In terms of controls, convertibles don't really need the Microsoft-mandated keys that allow basic manipulation of keyboardless slates, but the CF18 offers some anyway. Along the front of the computer is a touch control panel for screen brightness, screen rotation in four 90 degree steps, alt-ctl-del, and one that brings up the Tablet PC Edition onscreen keyboard/input panel.

The 91%-scale keyboard of the CF18 is a mixed blessing. It is nicely designed and the keys provide good tactile feedback, but why not make a few unimportant keys (bracket, colon, etc.) a little bit narrower so that the ever-important alphabet part of the keyboard becomes comfortably full-size? We've advocated that minor and yet so important change for years and it's unfortunate to see usability needlessly hampered by that kind of easily-fixed design flaw.

Under the hood, the CF18 benefits from Intel's Centrino technology. A 900MHz Ultra-Low Voltage Intel Pentium M processor and Intel's 855 chipset make for brisk performance, and the Intel Pro/Wireless 2100 network connection adds integrated 802.11b wireless connectivity. All of this is powered by a more than respectable 49Watt-Hour (7.4 Volts, 6.6 Ah) Lithium Ion battery pack that is said to last between four and six hours. Standard storage is 256MB of DDR SDRAM, upgradeable to 768MB, and there's a shock-mounted 40GB hard disk.

In summary, Panasonic's first entry into the Tablet PC market has a lot going for it. It's an advanced, compact, versatile notebook computer that combines excellent industrial design with superior functionality. www.panasonic.com



Time to turn pa1mOne into palmOney

by Shawn Barnett

I guess I'm finally jaded after all these splits, spinoffs, mergers, and name changes. I suppose it gives MBAs something to do, but in the end it doesn't do much for the end user.

This Palm Inc. split has been a long time coming. Internally it happened a long time ago. PalmSource and Palm SG employees were giving grief to those who still referred to the company as one entity, because the distinction was very important to them in how they thought about their work. Perfectly understandable. But to those of us on the outside the product is Palm, the OS is Palm. It's a Palm. And despite the ever-shifting branding efforts ("Please refer to it as a Connected Organizer—no, now it's a Palm OS Handheld"), most people refer to just about any small computer, including Pocket PC devices, as a Palm Pilot. Makes you wonder if they shouldn't have just licensed the name from the Pilot Pen Corporation years ago and gotten it over with. After all, having your name as a part of the lexicon for your product category is more valuable real estate than any address in Silicon Valley, no matter what the trademark attorneys try to sell you.

So now it's palmOne, with the "L" in palm shaped like a numeral one, and a capital "O" in the middle. Provided everyone uses the capital "O" and lowercase "p" people won't pronounce it "palmonie," as in Martini and Rossi Asti Palmonie. They could have dumped the numeral one, in my opinion. It's overkill to put one twice. Isn't that eleven? With a big 1 and an O it looks like 10; more like a cryptic password than a company name. I suppose I'll get used to it.

Meanwhile the excellent blue ball Palm logo will be lost to history just two years before it was allowed to make an impression. Coca-Cola gave it a little more time before abandoning their now-well-accepted and universally recognized logo, as have Ford, McDonald's, Microsoft, AT&T, Sony, and IBM. Pick a brand and stick with it until everyone knows it; and if everyone already knows it, for goodness sake don't change it.

Now that the business strategists have had their fun, I trust that the creative folks are back to work making great products; and perhaps the biz guys can set about creating a marketing campaign that will make the new logo work to turn their already sizeable market share into some black ink on the bottom line. The new website is a good start. Now it's time to stop changing colors and become the great company we know you can be.

Treo 600 Launch

In related news, I enjoyed Handspring's last big show in San Francisco at the beginning of October, on the same day that palmOne and Sony announced new product. The event was attended by folks I'm not used to seeing at Handspring events: namely, a lot of palmOne people. It's been a long time since I've seen

best integration yet, with nearly every function easily accessible from a button or the five way nav system. Along with what appears to be excellent integration comes a decidedly higher quality feel than any past Handspring product: more like a phone. I plan on giving another head-to-head test against the two-piece wireless solution to see how far we've come.

Ed Colligan waves the Treo 600 at the launch party held at San Francisco's Mezzanine



Attendees were greeted by this Mission Impossible silhouette



Joe Sipher demonstrates the ease of sending a photograph with Treo 600



certain of these folks together on the same day. The whole Handspring gang was on hand, including Ed Colligan, Donna Dubinsky, Joe Sipher, Allen Bush, Brian Jaquet, Michelle White, Greg Shirai, and Jeff Hawkins—all roaming around freely talking to whoever came along in that signature casual Handspring style. It'll be interesting to see how they meld back into their old company after the merger.

The Treo 600 itself appears to represent a lot of time spent on Handspring's part. It joins a lot of other capable handhelds vying for consumer dollars. Its killer app is not an app at all, but better integration of the features manufacturers are trying to shoehorn into the handheld: camera, cell phone, instant messaging, and PDA. Handspring may have pulled off the

And then there were two

Though there are many PalmSource licensees, the Palm SG/Handspring merger leaves only two major players: palmOne and Sony Electronics. One is completely dedicated to handheld devices as its sole business purpose. No other handheld maker can say this. As such, they are focused on making the best handheld solutions possible and nothing else. The other is a design-driven electronics and media powerhouse with the ability and intent to make handhelds an integral part of their overall vision of consumer entertainment and productivity. Both say they are going to increase their product cycles, meaning new designs more often. I've questioned the wisdom of this strategy, but there is no doubt: it's going to be fun to watch. *LB*

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Palm Tungsten T2

Incremental upgrade offers better screen... in most light

When I first held the original Tungsten T in mid-2002, I marveled at its sharp new form, new screen, and obvious power. My only negative comment was that the screen seemed dim. "Will the final version be brighter?" I asked. The answer was no. I knew that competitors had already switched to backlit transfective designs, including Sony and HP/Compaq, and that the screen of the T was not nearly as bright. Eventually I chose the T as my main carry, and didn't really notice the relative dimness. Like I did with the old monochrome screens, I adjusted it to the proper angle for best viewing instinctively. I enjoyed the screen's surreal metallic sheen in just about any light.

When the Zire 71 and Tungsten C came out earlier this year, however, I began to think my T was dim again. I couldn't help it. Having become so used to the T, the Zire and C would shock me every time I picked them up. I knew

ferings, because the Zire 71 and C don't meet the mobile traveler's needs in quite the same way.

Well, the Tungsten T2 is here, and it brings with it the improved screen, more RAM, a different color, the latest OS, and a more solid feel, as well as more bundled applications permanently loaded onto the device. But though the screen is better in most situations, it might be referred to as merely "differently-abled," as you'll see in my photos below left.

The screen

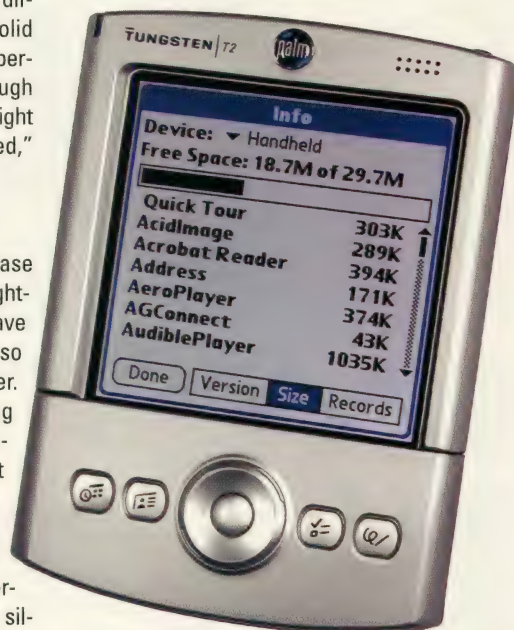
Palm has a history of trying to match the case color or the Graffiti area to the relative brightness and tone of the screen. As screens have gotten brighter, cases usually get lighter so that the one does not overpower the other. The T is a dark gunmetal blue gray, looking very official and space-age, and the dimmer screen stands out against it in most light; in bright light, it's a complement to the screen's metallic background. Because the T2 has a brighter, almost paper-white screen, they went with silver anodize on the casing. If you never saw the T before, you'll think the silver is great, but I feel a sense of nostalgia for that darker, space-age look.

Side by side comparisons show the T2's screen to be dramatically brighter than the T, or any other brand of PDA (the Palm Zire and C are nearly identical to the T2, of course). When I set the original, front-lit T at its brightest, I have to set the T2 at 1/4 power to match it. Colors are more vibrant, and contrast is dramatically better.

In most situations, the T2 is an improvement over the T, as you can see in the pictures below. The only exception is in direct sunlight, where the T out-reflects the T2, which, like its newer brethren, appears to have a yellowish polarizer or other filter between the digitizer and LCD. It is a tradeoff that will have to be considered by

those who frequently use their device outside. To my eyes, it's not terrible, just not as good. Others have been more critical than I when it

comes to accepting screens like the m130 and Treo 270 in direct sunlight. Perhaps because I remember the days when TFTs that were brilliant white indoors would go completely black



in sunlight, like the Palm IIIc. The screen really is gorgeous everywhere else, though, and photos simply stun, so I think most will be happy with the tradeoff.

Externals

Other than the color, the externals of the T2 are the same as the T. The screen is offset to the right, there's a record button on the left, the SD card, IrDA port, and power are on top, and there's a slider that opens to reveal the Graffiti area. What is different is the feel of that slider. It's far tighter than the T, and as a result is a little stiffer. You also have to be more precise in your pulling effort, because only a straight downward motion will open the unit. The result is a higher-quality feel both open and shut. You can also put the open unit in a cradle without sliding it shut accidentally, as often happens with the original T. As for slop, there's very little. It can be moved left to right a little less than a millimeter, but friction keeps it from rattling, an improvement over the T.

Internals

The T2 has the same 144MHz TI OMAP1510 processor as the T, but more RAM: 32MB,



T vs T2: above is outside in shade, below outside sunlight



they had to come out with a T that had this improved transfective screen, which was noticeably brighter than either Sony or HP's of-

those who frequently use their device outside. To my eyes, it's not terrible, just not as good. Others have been more critical than I when it

29.7MB of which is available for programs. A small speed improvement can be seen, due to the newer OS, 5.2.1 (the T has 5.0). Despite my 256MB SD card, the memory in my T is getting rather cramped, so more RAM is another major plus for the T2.

T2 with G2

Most unfortunately, the T2 has Graffiti 2, something most Graffiti-literate Palm users will find a nuisance. Even when I add Teal-Point's TealScript to restore real Graffiti functionality, Graffiti 2's two-stroke characters mess with my speedy input. If I enter a traditional Graffiti lowercase "i" then a space, it becomes a lowercase t. If I enter a lowercase "i" again, then a "c," it becomes a "k." The trick there is to remember to pause between characters, but it's not that easy to do when you're used to going as fast as the muscles will allow. I'll spare my usual anti-Xerox rhetoric and just suggest that you buy a Ricoh, Minolta, Canon, Brother, or any other copier in the future, because it's Xerox's petty and idiotic patent suit that's caused this disturbance in how my favorite handheld functions.

Video

Kinoma's video player has a test that I ran to discover something about the Tungsten C and Zire 71 when they came out: that the video performance on both when playing from an SD card was faster than on the T. Palm representatives told me that it was because the SD slot on the T has only a 1-bit data path, and the new Zire 71 and C have a 4-bit data path. Retesting on the T2 reveals that though it's now faster than the T, it's still not as fast as the Zire 71 or Tungsten C. The Zire 71 is fastest, running the Crouching Tiger trailer in 11.3 to 12.6 seconds as opposed to the T2's 13.9 to 15.9 seconds from the same SD card. The T does it at between 19.1 and 21.3 seconds. The speed seems also to depend on the amount of available RAM. As such, my testing is inconclusive about the presence of a different SD controller in the new T2, since the speed improvement could be due to more RAM or the new OS.

Audio

All that I should mention here is that my Tungsten T seems to be louder than the T2 when playing MP3 files, even with AeroPlayer's enhanced decibel and equalizer functions. Because I usually plug it into the audio jack of either my car or desktop speakers, it's not that much of a problem.

There are few other major differences to report, except that, like the Tungsten C, the T2 has most of the major applications permanently loaded on the device, like Documents to Go, VersaMail, and WebPro, giving one more confidence to take the device by itself on the road, since a complete power failure or crash won't eliminate these critical mobile programs. It also includes the two Bluetooth applications, BlueChat and BlueBoard, but I really haven't used those since my initial testing. The Preferences screen is now in bullet-point style, like on the 71 and C, and writing full-screen is now supported. Finally, the Phone Link application is up-to-date out of the box, with all the latest cell phones and GSM networks already built in. The WebPro browser, by the way, is still a proxy browser, unlike that on the Tungsten C, so no scrolling back and forth is necessary to read a simple Web page.

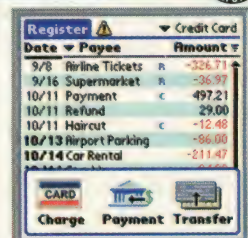
This is an incremental upgrade, much like the Palm V to Vx or Palm m505 to m515. It's mostly a RAM and screen improvement with minor cosmetic differences. If you're a T owner in need of more RAM, the T2 is a good choice. So long as you mostly use your device indoors, you'll be very pleased with the new screen. With a Bluetooth phone or access point, both T's are excellent communicators for email and Web browsing, and you can still play MP3s, audio books, and videos like before. I use my T for all of the above and more, including tracking my bank accounts, reading books and news, looking up word definitions, storing passwords, carrying pictures, and playing the occasional game. Happy Tungsten T users shouldn't necessarily run out and upgrade—you'll want the T3 (see page 27)—but this is a good entry-level T at the reduced price of US\$329. www.palm.com

—Shawn Barnett

pocketquicken

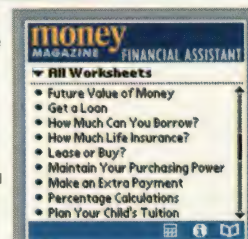
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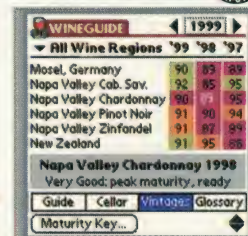
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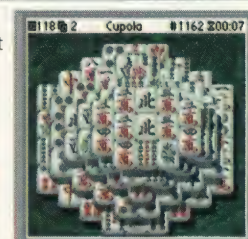
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Sony NX80V

Refined CLIE NX device is even more nimble, useful, and attractive

Sony's latest, the NX80V, is a refinement of their vertical clamshell design. It is smaller, slimmer, and more functional than any of the previous NX series, with small improvements apparent everywhere. The NZ90 notwithstanding, we saw fit to name this device our Editor's Choice in the Pen Computing Buyer's Guide for Advanced Palm because it better suits the needs of the common PDA user, including excellent data features, slim profile, and good battery life. Though as of this writing there are two new devices entering this category (the Palm Tungsten T3 and Sony CLIE UX50), the NX80 still holds it own.

Compared to the NR and NX devices that have gone before, the NX80 is improved in almost every way. The device is a 200MHz Intel StrongARM device with a flip and twist 320 x 480 display and a built-in 1.3 megapixel digital camera with illumination lamp. Technically, it has 32MB RAM, but only 16MB are available for user-installable applications.

As for the NX80's capabilities, they are staggering.

I'll have to hit upon them as I go along so as not to bore with long lists.

The only thing I find lacking is Bluetooth functionality. WiFi

is optionally available, and the wealthy courageous few can also opt for the foreign CLIE Bluetooth card (US\$229 at MobilePlanet.com); unfortunately you give up Memory Stick expansion with this accessory installed, memory that is faster and more useful than CF expansion, as we'll see.

Dual Expansion

Since the debut of the WiFi slot in the NX70V, people have complained of two things: the extra bulk from the slot, and the lack of Compact Flash support. Sony has eliminated both complaints with the NX80's pop out expansion port, which is compatible with their WiFi card and most CF cards. The old slot was indeed what made the NX70 such a chunk to bring along. The new mechanism releases with a spring-loaded slide lock. The slot pops open, ready for action. You can insert a Type I or Type II CF card, which loads automatically. With the slot in use, of course, the device is once again about as thick as the NX70V, though it doesn't appear to be.

The addition of CF support will be good news to those wanting to carry large amounts of database or text information, as medical students often do. Most disappointing is the lack of support for photos and videos. You can neither record these data types from the device's camera to the CF slot, nor read photo or video files created on an external digital camera. You can copy them with the CLIE Files application to RAM or Memory Stick and read them then, but not natively from the CF card itself. You could also use the CF card as a means to store

info collected onto the Memory Stick; unfortunately that can take some time and is cumbersome. MS Backup likewise only works with Memory Stick. The reason for this limitation is not clear.

New hinge design

The NR and NX devices had a slightly different hinge design, which integrated the hinge and camera on the same pin. The NX80 and NX73 both have the camera rotating around the middle of a fatter barrel, with the screen hinging off the front portion of this barrel. This serves a number of purposes. It allows room for the pop-out CF slot, allows room to move the stylus silo to the top instead of the bottom for a more traditional feel, and gives ample room for the dual-strength IrDA port (one for beaming out to the side, and a more powerful transmitter for remote control operations toward the front).

The camera is also better than other NX or NR devices. It rotates 300 degrees, and at its furthest-forward rotation snaps into place for lens protection (at this point it is facing down into the device). It can capture 1280 x 960 pixel images with the help of its illumination lamp and neutral density filter, both firsts in the CLIE line. The capture light is toggled on via an onscreen button, but the neutral density filter slides into place with a mechanical switch that you access either with the lens rotated fully forward or facing away from the user.

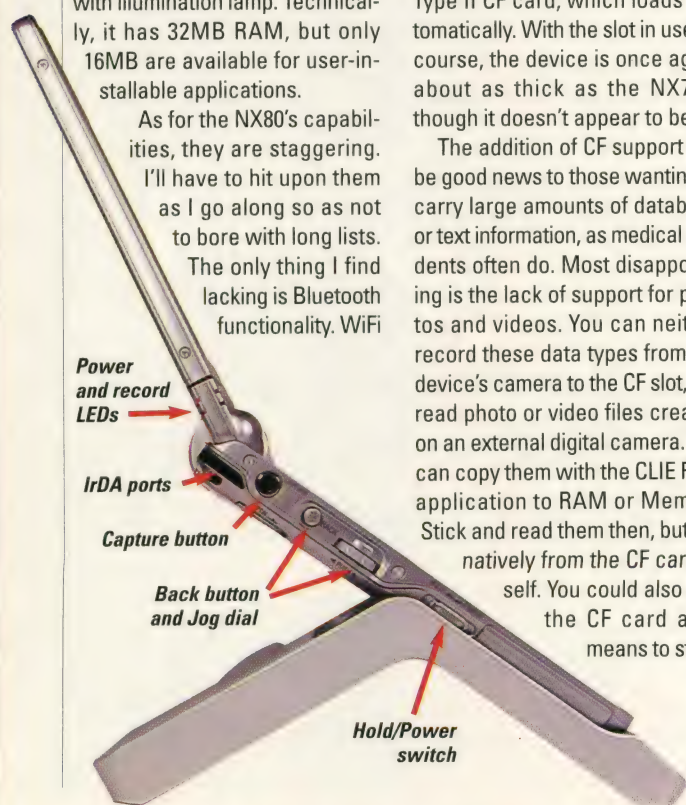
Pictures are decent, though those wanting film-quality prints shouldn't rely on the NX80 to deliver them. Instead, you should view the built in camera as a fun

accessory for photos and videos that aren't too critical.

The lamp helps fill in the shadows when taking pictures of faces indoors, and also helps when using the camera as a stealth document copier, or with video. Video is surprisingly small and grainy when blown up, though it is cool that you're able to rotate the screen on playback to take advantage of the wide screen. Max resolution for video capture is 160 x 112. When videos are captured on another device and imported into the NX80, however, they can be as large as 320 x 240. I'd have liked to see 320 x 240 video capture at least, if not 320 x 480.

Software

As has been true with other CLIEs, the software bundle is extensive. Users are able to upload videos, songs, and data files of all kinds onto either the onboard RAM or a Memory Stick. Data transfer is done in the cradle, but not through a HotSync application. Instead, the user launches the Data Export program on the PC, then launches the Data Import application on the CLIE, and hits the onscreen Connect button. Then it's back to the PC to select what you want to upload to the NX80V. It's not the most friendly interface, but it works once you figure it out. You're greeted with a blank screen that has two tabs: Begin Installa-



tion and CLIE Card Drive. Click on Add to pick what you want to upload. If you want to see what's on the Card already, click on the other tab. I still found it odd and uncooperative, but it did work for either deleting and uploading files to the card. An album of MP3s copies over in a minute or so. It's a heck of a lot faster than HotSyncing, in my experience.

Collapsible stylus

As I mentioned, the stylus is no longer accessed at the bottom right of the NX80V. This was always a problem with the older units, because the stylus would fall out of gravity's ever-present influence; it was also just too different from any PDA that had gone before. Those who hate the CLIE's slim stylus will like this one even less, because its expansion capability makes it even thinner at the top when expanded. I'm fine with that, I just like that it's back where it belongs and is less likely to be lost. The expansion mechanism works fairly well, locking into place at the top of its stroke. Even without locking, it slides stiffly enough that it won't be collapsing without the user's consent.

Application buttons

One thing lacking from the other clamshell CLIEs was a second set of application buttons for use when the unit is in what I call PDA mode; that is, the screen is flipped over and folded back down. These first appeared on the NZ90, mounted on the bottom edge of the screen. On the NX80, they're round buttons in a more traditional position. They're deactivated in keyboard mode, where they are indeed less than useful. It's the kind of feature that makes it a worthwhile upgrade for otherwise happy NX owners.

Backlit keyboard

Long overdue on many PDAs, including the CLIE is a backlit keyboard. Just press any button on the keyboard and it activates instantly. It's a dispersed set of yellow LEDs that appear hot in a few

places; but the important part is that they're there.

The keyboard is mostly the same, and still lacks sticky keys. I do notice that they gave the @ symbol its own key. It's a good choice, because past models required users to press both the function and @ key at the same time—and they were right next to each other, making for a difficult maneuver. The number keys are sadly still embedded in the QWERTY line, despite that huge unused area below. These are not major matters for those who will be excited that there's a keyboard in the first place.

Input

Well, let's see, there's USB, Memory Stick, CF, a microphone, a digital camera, IrDA, optional WiFi, and a keyboard; what other kind of input could there be? Pen input, of course. Of that type, there are three (four on my device, but I'll get to that in a moment). The traditional Graffiti has sadly been replaced by Jot-based Graffiti 2.

There are still more keyboards, as well, including Palm's built-in keyboard and Sony's silkscreen-replacing keyboards. And now there's Decuma, the Swedish solution to text input that accepts whole words and numbers across a line. This works pretty well for whole word input, converting text into a neater version of what it thinks you wrote. Reminds me a lot of having a first grade teacher correct your work after each letter.

The fourth item I have loaded on my machine is TealPoint's TealScript, which gives me back my original Graffiti and makes these devices usable again. Decuma and maybe even Graffiti 2 will be great for completely new users, but give us veterans our Graffiti. TealScript will even allow you to customize your recognition

with new strokes for characters you have trouble with. I've had trouble with recognition speed on the T2, but speed is excellent on the NX80V.

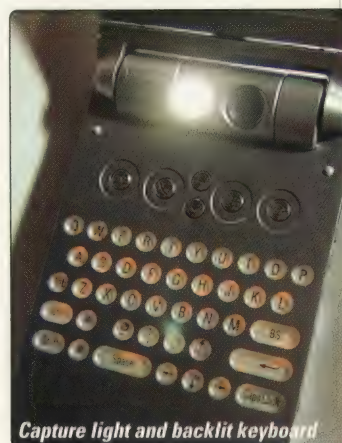
Appearance

The NX80V is impressive and appealing. It has smoother lines and more delicate design treatment. Though I say delicate, I don't mean that it doesn't appear capable and sturdy. It's a mixture of refinement and utility that can only be grasped in person. I like the Memory Stick on the right side, with its disk access light and reset button nearby. The Voice Record slider is just above it; it's probably better that this feature is here to prevent accidental activation.

Most of the usual components are on the left, including the capture button, back button, jog dial, and power slider. They've improved this latter feature: it no longer accidentally snaps into "Hold" when the momentary switch is held down and released quickly. Hold turns off all features, quite the opposite of most user's intentions when hitting the power switch, and I'm sure that former tendency has frustrated quite a few.

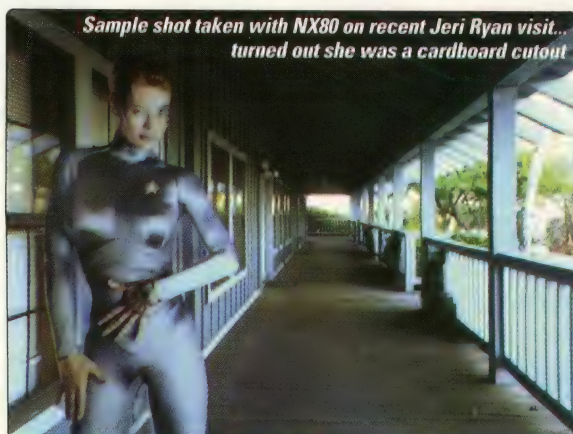
My only complaint about these control features being on the side of the unit is that two of them become unavailable for use when the unit is in its included cradle. Those are the power switch and the Memory Stick. Crazy. The speaker is also blocked. Soon as I have a free moment I'll probably get my drill out of the truck and make a

product. Without a single download or having to search on the Internet, users are able to customize their NX80V to do things



they never imagined. They can also do things that most users would assume should be possible, but are missing from other company's offerings. Things like backing up files to an external card, made possible with Sony's built-in MS Backup (MS stands for Memory Stick). Not only can you make a backup with this app, you can make more than one and archive several copies of your device's configurations and data.

It has a world clock, remote control, desk calendar and picture frame program, voice recording, MIDI alarms, a Web browser and Email program, and a doodle pad built in, all in addition to the camera, music player, and organizer functions. Its brilliant, bright screen is sharp and has more intuitive information at your fingertips than past Palm OS devices have had. From nearly anywhere you can get



back to the launcher and see both the time and battery status at a glance; a battery, by the way, that gets around 75% more time in MP3 playback mode. It is also the most expandable Palm OS device we've seen, with CF, Memory Stick, and USB ports. All these features and refinements add up to make the NX80V an

easy best buy recommendation for upgraders and new purchasers alike. *—Shawn Barnett*

Sony PEGA-CC5

Most comprehensive car cradle to date reads email, datebook, and gives voice directions while charging

Most comprehensive car cradle to date offers some disappointment with a lot of promise. It is by far the most comprehensive and inclusive car cradle I've reviewed—or even heard of. Right out of the box it integrates car charging, GPS navigation with turn by turn directions—including spoken prompts via its built in voice synthesizer—music playback via FM transmitter, and even the ability to read your email as you drive, again via the voice synthesizer. Though it comes in many pieces, it goes together quickly and mounts to the air duct in most cars with surprising ease using a zip-tie method. It'll even auto-dim the PDA's screen as the light changes, brightening it quickly when you go through a tunnel, for example.

Where it goes wrong has more to do with lawyers and safety advocacy (read: Liability) than with bad design. There are a few things I'd like it to do better, which I'll outline, but by far the biggest disappointment is that when the device is in the cradle, in my case a Sony CLIE NX80V, it ceases to function as a normal Palm device. Instead, a whole new set of programs takes over, programs designed to be simple enough to use with a finger tip and get your information at a glance.

Sounds great so far. Until you find that you can no longer access your address book for phone numbers; if you had a TG50 set up to dial your cell phone, say, you wouldn't be able to dial via Bluetooth to save your life. Nor are most of your other "conventional" programs accessible while the device is in the cradle. You can't take notes. You can't change settings. You can't even see your To Do list.

Yes, modified versions of the Date Book, MP3 player, CLIE Mail, and Photo viewer, along with part

of StreetFinder are available and certainly enhanced in many ways, but you're not going to be entering any new data or modifying any settings while in these special versions of your essential programs. You'll have to take the even more risky step of taking the computer out of the cradle to do these things. That means you're back to looking up a phone number while driving a car at the same time. No, you're not supposed to, but that's why a lot of you would buy a cradle like this: to make what you already do that much more safe.

Well, you can't.

The good

But there are a lot of things your NX80, NX73, and TG50 can be transformed into that you never expected would be so easy with your PDA. The hardware is a quick install. It attaches to one of the vanes on your air vents with a hard plastic zip tie that runs through the body of the clamp. One end of the zip tie is a hook. Just hook that onto one of the vanes and pull down on the zip tie until it's snug. Be sure your vanes are sturdy enough, but both of my cars were strong enough. Several little attachment feet allow adjustment for different dashboard styles. That done, just route the cables around the car using the decent complement of adhesives and hooks that come with the kit, and you'll have a well-installed car cradle/GPS in around 15 to 20 minutes.

GPS Installing the GPS can be done in two ways. It can be installed inside the car on the dashboard, or it can be magnetically attached to the roof of the vehicle. Having had a lot of experience with dashboard mounted units, I opted for the roof. The GPS sensor's 1 x 1 inch footprint houses a powerful magnet which made it easy to just toss up there



without worry. It's an excellent solution for non-permanent installation. I got very good accuracy with it on the roof, and far faster acquisition than I'm used to from other PDA-based GPS solutions.

The StreetFinder software is familiar, since it's used by a lot of companies these days for handheld navigation. It's good, but in need of an update. It tracked and zoomed fairly well based on speed, and its integration with the speech synthesis in the CC5 was

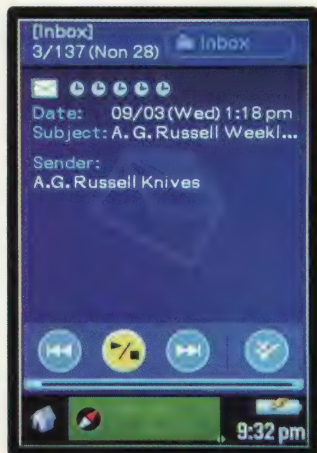
impressive. Turn by turn directions were generally understandable and helpful, with plenty of warnings and audible queues to indicate the exact turn time. But there were quite a few times on long roads where the system would declare that I was "Off Route," only to announce moments later that I was "On Route" again. Sometimes I would go miles and miles tracking just a few yards off the green "highlighted route." Though that's not a big deal, the software also refused to give me directions until I was back "on route," something I couldn't do without crossing into oncoming traffic. I've experienced this bug with other systems using this same software, including Magellan's m500 GPS Companion, so it's not unique to the Sony CC5 implementation.

Another peculiarity of the software resulted in a bit of humor. The software will only give you directions if you're starting where you told it you would. Retracing your steps, as we're all liable to

do after successfully finding our destination, results in instructions that will only take you back to the initial destination. Occasionally, it will let out a chime, followed with the somewhat urgent admonition, "You are going the wrong way!" This kept my daughter and me in stitches for a good 45 minute ride home from work.

Also problematic with the StreetFinder software is that it only gives you one route to your destination with no consideration for traffic flow. For example, to get to Monterey it routed me through the East Bay along hundreds of miles of heavily congested freeways and even a few windy roads, when I knew I was going to go down the far less congested Interstate 5 and cut into another major route that bypasses all that traffic. But the software usually got me there without error, and the times it did fail were pretty confusing even to me. On two occasions the software led me absolutely wrong, having me exit when I should have stayed on the road straight ahead. In both circumstances, it was clear there was recent construction in the area that changed everything. Just beware.

Though there are areas where the GPS is helpful, I was disappointed that the GPS Meter application didn't offer more basic GPS information. All it really offers is a



sky map of which satellites are in range. I was expecting items like direction, speed, distance traveled, waypoints and bread crumbs. You know, basic GPS stuff. If you tap along the bottom of the screen, you do toggle between a few screens: a paper-tape style speed graph (which maxes out at 65), a latitude/longitude indicator, an altitude and compass indicator, but there is no screen that shows it all at once, something I'd like when I drive off the map to follow my less-congested route.

Music While you're driving and getting directions from the computer through the CC's built-in

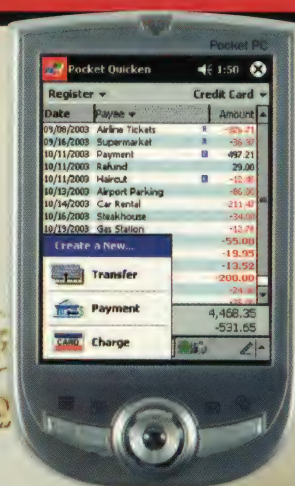
speaker, you can also listen to music from your Memory Stick, broadcast to your radio via the on-board low-power FM transmitter (it even dims the volume of the radio playback when the voice synth wants to tell you something). This worked well enough in my car, but had unacceptable static in my truck. Either way, volume was low, and as I drove along hills and over distances, the FM station I'd chosen would inevitably be occupied by an overpowering station and screw up my MP3 playback. I understand that's just the way these short range FM gizmos work. It would be helpful if you could adjust which FM station you want the device to broadcast to with the unit in the cradle, but the settings dialog is only available in out-of-cradle mode. Most users in hilly areas with many radio stations will just give up and ignore this feature. Because Sony also offers a wired connection to some Sony-brand car stereos, serious MP3 devotees

should just invest in one of these stereos and go the wired route.

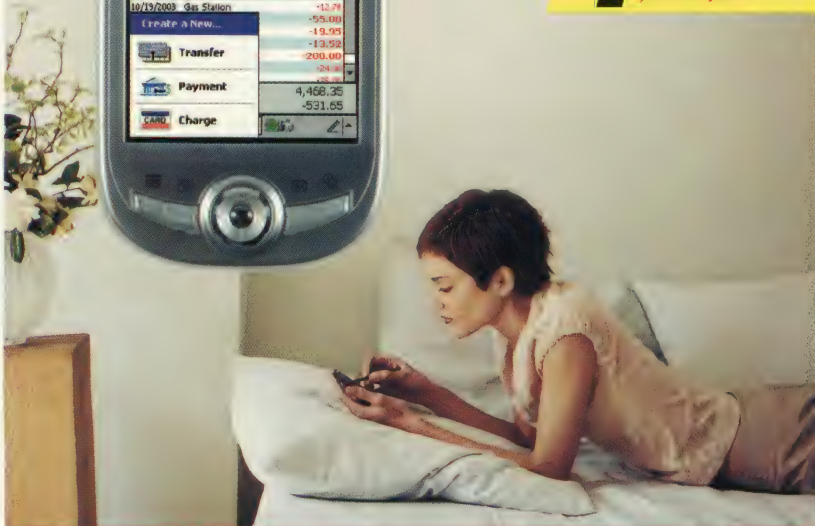
For fun, you can program the music player to display your favorite pictures onscreen as it plays. It's a nice touch that takes advantage of the CLIE's gorgeous screen.

Mail One of the more useful applications is the Mail app. It's surprisingly useful to be able to scan your email audibly. In general, you sync your email from your desktop to load the email onto your device. The exception would be the TG50 with its bluetooth capability, or one of the two NX's if used with the WiFi adapter. The voice synthesizer shows its power when reading complicated emails, and Sony did a lot to make some surprisingly natural-sounding speech. Sentences typically start slightly higher in pitch, and end in a lower pitch to bring conclusion to a sentence. It seems the synthesizer analyzes the sentences first before forming its ap-

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Samsung i500

The smallest expression of wireless voice and data

Long has it been said of Palm OS communicators that they are far too big to be accepted by the masses. "It's too wide, it's too heavy." No more. The Samsung i500 is small and elegant, with all the power of a basic Palm and all the conveniences of a cell phone, including two batteries, a large dialpad, and excellent CDMA-quality sound.

I'm careful to say "basic Palm" because though the i500 has a fast Dragonball Super VZ running at 66MHz, the lion's share of current Palm OS PDAs are running on far more powerful ARM processors. That means it can't run a few of the cooler applications emerging for OS 5 devices, like MP3 playback and video with audio accompaniment. Nor does it have an external expansion slot to give it enough memory for such applications.

But that's not what the i500 was designed to be. Samsung wisely stuck to their mission and made a small phone that runs the Palm OS very fast. It browses the Web, gets your email, and integrates with Sprint's PCS Business Connection Personal Edition for better email control, scheduling, and phone lookup from anywhere.

Device

The 4.7 ounce i500 fits in the hand just right, its skin as velvety to the touch as to the eye. Its flip is best opened with the unit in the dominant hand using the thumb of the other. The lid now open, you're given your first look at the vibrant 64K color TFT. The four-button quick dial sits in a blue background

that matches the blue glow coming from behind the 14 key dialpad. You can select one of the speed dial buttons or just start dialing. You can also hit the up

scroll button, which launches the Search function. Here you can search the address book by phone number, name, or company.

Right under the 162 x 176 pixel screen are four application buttons for launching the Address Book, Date Book, Blazer browser, and VM/email application.

Below that, and above the keypad, is a traditional Graffiti area (incidentally, it still runs good old Graffiti, not G2). And between the keypad and the Graffiti area are the scroll button and an OK and Back button, which you can use to navigate onscreen without a stylus.

Left and right are a few buttons whose purpose can change depending on the mode. Two of the left buttons control the volume in the phone mode, and they also scroll in the Blazer browser. On the right are voice dial and "back to phone" buttons, both of which offer quick access to dialing. The only problem with these buttons is that they're very easy to accidentally activate when merely holding the unit.

The back and top have the biggie—though not offensive—rectangular antenna, a lanyard lashing point, IrDA port, ringer speaker, battery release button, and an expandable stylus similar to that on the Sony NX80V. The stylus is very nice, and its top conceals a reset pin; but I really have to question its position on the left of the unit. You might think that was fine, great for the lefties, but it's really not great for anyone when you have to make a large effort to get it out at all. I have to put the phone in my right hand, and employ my left fingernail to pry the stylus out. They gave it a grip, but it's in too tightly, and has a lip blocking accidental removal, both of which make removing the stylus a chore. We've seen this on almost every new handheld cell phone, especially the ones trying to de-emphasize stylus use with elaborate button solutions. There must be a reason for the trend, but it's frustrating for the Graffiti literate.

The cradle that comes with the unit is also worth mentioning. Its angle of recline is low, but there is still room for the extra battery to slide in from the rear. There are two charging status lights on the cradle, one for the phone and one for the spare battery. They shine red when charging and green when fully charged. The

phone is gripped by two fingers left and right for a secure fit in the cradle, one that nonetheless breaks free easily with a simple pull in the right direction. The power cord at the back disconnects to serve as a travel charger. My sample unit came with two batteries, one slim and one standard. The slim is capable of 2.8 hours talk and 210 hours standby. The standard is 4.2 hours talk and 250 standby. An extended battery can go up to 5.4 hours talk and 350 standby. The slim is extremely light, and naturally offers the greatest portability, but I found I didn't notice much additional bulk with the standard battery.

Use

It's inevitable. Though those of us who've been watching the category have long said the ultimate PDA/phone needs to be smaller to be accepted, someone is going to complain that the finest mix of PDA/cell phone to come along is just too small for comfortable PDA use. I will disagree with them in advance, but will also be the first to admit that such a small device does require finesse. It also requires good near vision, because the screen, while bright, displays some fonts that are a single pixel thick. They made an effort in most of the

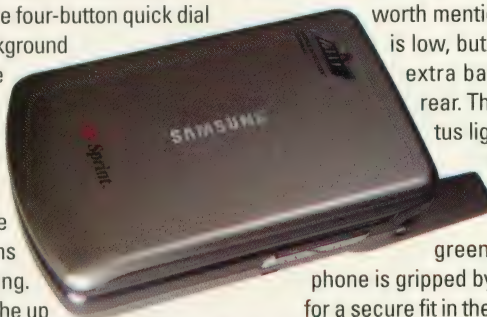
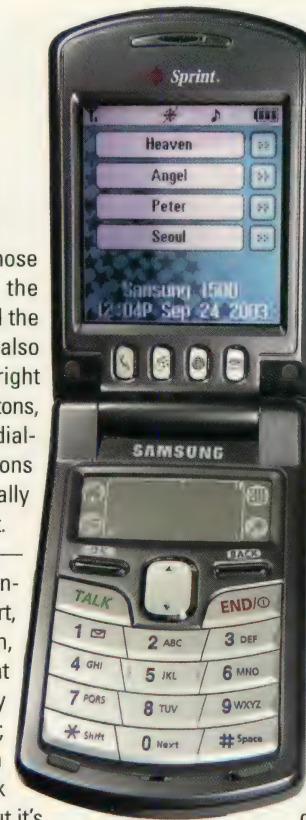
dial modes to thicken

them up, but pure PDA apps written by third parties will use single pixel fonts, assuming that the device is a full-size Palm device.

Samsung wisely reprogrammed many of the applications for easier use on the small screen, starting with the single most

important application for a phone: the Address Book. It's been modified to dial quickly straight from the main address list in two ways. You can tap on the name to pull up the entire listing, then tap on the phone icon next to the number, or tap on the number to bring up a full dialing dialog that lists all

available numbers. Alternately, you can just press the OK button to dial the de-

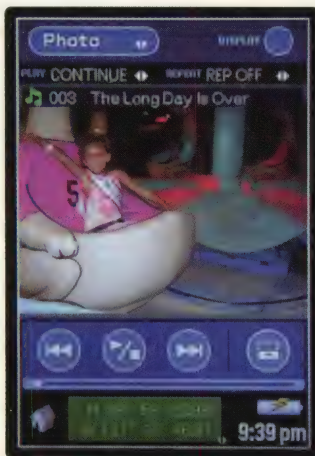


continued from 49

proach. Also impressive is the ability of the device to take dollar amounts, like "\$65.98," and transform them into "Sixty five dollars and ninety-eight cents." Unfortunately, it also assumes all "Dr." abbreviations are "Drive" and never "Doctor." My dentist will be disappointed that he's been demoted to the status of a road.

It's not perfect, of course, due mostly to the complexity of modern email. Too many emails these days are HTML based and peppered with cryptic links to graphics and pages. The voice synthesizer doesn't discriminate, though, and will read the most convoluted links all the way through, making HTML email more trouble than it's worth (imagine: "HTTP-colon-forwardslash-forwardslash-doubleyou-doubleyou-doubleyou-dot..."). Hopefully future versions of this software will learn to skip most of these tags, perhaps ignoring items in French brackets. Also helpful in future versions would be the ability to track text onscreen as it's read. There are many times when what the computer is saying is unclear, either from road noise or just odd words. Being able to glance over and get the actual words would help. The only way to actually read your email otherwise is to remove the device from the cradle and go to the PDA mail program.

The simplest of all is the Schedule application, which merely reads the date and items for the day. When launched subsequently, it reads you the hours and minutes



remaining before the next appointment and tells when and what that appointment is. It'll be handy for the person who spends a lot of time in his car. You can scroll forward as many days as you like, but you can't go backward at all without again removing the device from the cradle.

It does seem like there are a lot of limitations in the CC5. What's easy to miss is that the CC5 enables so much that was never possible before in one simple accessory. There is a lot I would improve, as outlined in the paragraphs above, but it's impressive and useful enough that I've installed and used it over and over on several trips. From what I can tell, most of my concerns and desires for the product can be addressed in software that is installed on the CLIE; the hardware itself performs

quite well. There's a lot of room for additional applications on that opening screen, and only six applications come with it, so here's hoping more will come out to take advantage of those two big finger-sized scroll buttons. An Address Book and the ability to dial a cell phone would be a good start.

Despite its current limitations, the CC5 is a mature product in the sense that it does more than anyone else has ever dared. Let's hope it's only a first step in a product that will continue to mature as quickly as Sony's other products, only this one simply must be software upgradeable. US\$299. www.sonymstyle.com

—Shawn Barnett

fault number. You can enter characters on the standard Palm OS Look Up line with either the 10 key method or via Graffiti. Either way is as fast as Palm users have come to expect.

Other manufacturers have used more elaborate lookup methods, but I think this works pretty well for both experienced Palm users and novices.

Browsing is via the Blazer browser, and it works very fast over the CDMA network. Images and text load quickly, due to the combination of download speed and the Super VZ's fast processing. Sprint provides their own front end for the browser, and their selection is comprehensive enough that I frequently got lost in the browsing experience while preparing this review. That's indicative of an interface that serves up information both quickly and unobtrusively, not giving my mind time to wander. That's not an easy task, believe me.

Several Astraware games are included in the bundle, plus ZioGolf, and a few limited trial programs. Because it's a Palm OS device, users



can turn the i500 into just about whatever they need it to be. With 16MB RAM, there's plenty of room for OS 4.1 applications and a decent store of data. My 1,118 Phone numbers and addresses alone take up only 168K.

Besides the light weight and tight feel, I like that the screen has just enough extra room for a network and battery status indicator on the top of the screen, which is always available.

The phone itself is a dual-band, tri-mode phone, meaning it works on 1900 and 800MHz CDMA and AMPS 800MHz. It also has a location-based feature, allowing 911 to find your location, and for programs to be customized based on your location if you choose.

Sprint and Samsung are to be praised for creating such a small and capable phone that still manages to be simple—without being crippled in the process. Unless you really need ARM power, the i500 will serve as a great phone and PDA for both novice and tinkerer alike. US\$599 —Shawn Barnett

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Hot Stuff

New devices and peripherals coming right up



With the recent introduction of the UX50 and NX80, Sony's "low end" was looking a bit old (almost a whole year!). Never fear. Two new models were introduced in early October, slimmer designs that seem to recapture the grace of the old T-series. The new units have 200 MHz iMXL Motorola ARM processors and 320 x 320 pixel color displays. The TJ35 has 23MB of available space on its 32MB memory chip, and the TJ25 has 11MB available of 16. Besides RAM, the major difference between the two models is that the TJ35 has MP3 player software and the TJ25 does not. US\$250, US\$199. www.sonymstyle.com

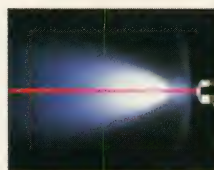
Expected in December, Palm's 1.3 megapixel camera uses the SDIO slot built into most of the company's handhelds to deliver 1280 x 1024 pictures. Images are captured in JPEG format and saved into onboard memory. US\$99.95 www.palmone.com



New stuff keeps rolling in as we go to press, stuff that'll be out by the time you read this. Since it's not out at press time, though, all we can do is tell you about them so that you can visit our website for more. It's going to be an exciting Holiday Season.



The latest keyboard to come from the minds of Think-Outside is a bit more rugged-feeling, and rather than using a different connector for each type of device, the new design is wireless, using IrDA to communicate with the handheld. Because the IrDA sensor is mounted on a boom, handhelds can be used in portrait or landscape mode. A stylus holder is built in for various sizes. It's also cheaper. US\$69.95 www.palmone.com



palmOne's new large pen has not only stylus and ink, but a flashlight and laser to boot. It's a multitool and fashion statement at once for US\$19.95 www.palmone.com

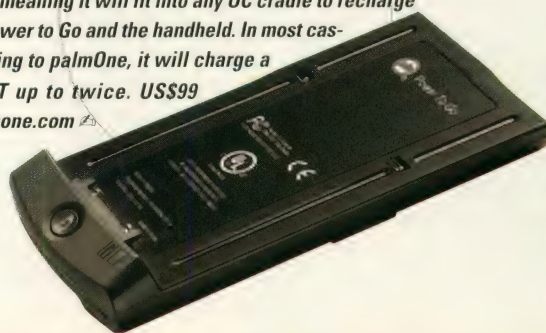


With a 1GB card, users of Sony TG, NX, NZ, and UX-series CLIEs can record TV programs onto Memory Stick media and take their television with them. Up to 4 hours of highest resolution video can be recorded onto a 1GB Memory Stick Pro (US\$599). Four compression levels are available, including HQ, SP, LP1, and LP2. A128MB MS can handle 60 minutes in SP mode. The recorder (PEGA-VR100K) will work with standard antennas, cable service, satellite receivers, VCRs, and Camcorders. US\$300 sonystyle.com

The Palm In-Car GPS solution uses Mapopolis software to deliver turn by turn directions from origin to destination, generated right on the handheld. Origin and destination information can be taken directly from the Palm Address Book. Comes with all cables. GPS unit uses ARM 7 processor for some functions. US\$149. store.palm.com



With the advent of new processors, along with the increasing utility of Palm OS handhelds comes the need for a little battery assistance. palmOne's new Power to Go recharging sled is both a battery backup and a battery recharger in one. What's more, you can leave the device in the sled while you recharge, since the Power to Go has a Universal connector, meaning it will fit into any UC cradle to recharge both the Power to Go and the handheld. In most cases, according to palmOne, it will charge a Tungsten T up to twice. US\$99 www.palmone.com



BackupMan

Everybody needs one, like it or not

BackupMan 1.3 is my new favorite utility for backing up my whole Palm RAM to an expansion card.

I usually recommend that any Palm user with a unit that sports an expansion slot should buy and use a Palm 16MB Backup Card. While that's good advice, the 16MB backup card does have its limitations. It won't work for any Palm that has more than 16MB of RAM, the card can only back up or restore all of the RAM (as opposed to file-by-file), it's relatively slow (about 5 minutes for 14megs of backup or restore in my decidedly unscientific lab tests), and the Palm 16MB backup card is US\$50.

The BackupMan program, on the other hand, addresses practically all of the needs you have for a backup card. It lets you use any expansion card with enough memory to hold your data. It doesn't have to be the only thing on the expansion card, so you can use the expansion card for many other programs and data. It can store multiple backup sets of data; it can restore individual files; you can set up exclusions that don't get backed up. It's really fast (around a minute for the same 14MB data) and it can be programmed to backup your Palm automatically at any time you like. Oh, by the way, it's just US\$10.

I keep a 256MB SD card in my Tungsten T2 at all times because it has ebooks, MP3s, and lots of data I use regularly. I sleep well because my BackupMan program backs up my whole RAM contents to the expansion card every night at 3:30 am. I've got 2 backup sets so I can restore data from today or yesterday if I need

to. And I've used it a couple of times to restore my Palm and had no problems with the data and preferences settings.

If you've ever restored from a HotSync backup you know that preference settings and other

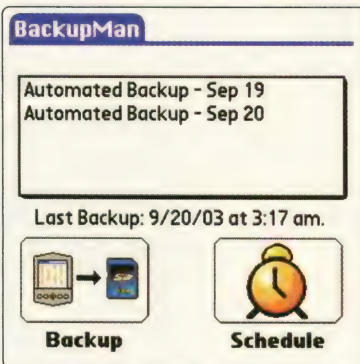
idiosyncrasies make for a challenging and potentially time-consuming restore experience. Restoring with BackupMan (or a Palm Backup Card) is a much better experience.

One strength of the Palm Backup card was apparent when I tried to migrate my data to a new Tungsten T2 from my old T1. The BackupMan software told me that the devices were dif-

ferent and data corruption may happen. I told the software to go ahead and try but it crashed every time. Performing the same task with the Palm Backup card DID fully restore all my data from the T1 to the new T2 with one minor flaw. The voice recorder on the new unit wouldn't work. I used a file utility to delete the Voice database files and then reset the Palm and had no further weirdness.

I should point out a couple of things here. If your backups are all on your only SD card—the one you leave in there all the time—and the unit gets lost or stolen, it won't help much. You still will benefit from backing up to an expansion card that doesn't live in your handheld full-time. There is a new Palm 64MB Backup card that offers enhanced features like individual file restore, but that sucker is US\$80. Because it's my money here, I'm buying a US\$39 64MB SD card from Staples and using my US\$10 BackupMan program to backup a couple of data sets I carry in my wallet. www.bitsnbolts.com.

—Larry Becker



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CLIE Camera	75	370
CLIE Demo	75	370

Whether you want to go faster or have more battery life, Lightspeed 1.2 will get you there... provided you have a Palm OS device with an Intel XScale processor. There are quite a few of these lately. Among the fastest is the Tungsten C at 400MHz. Lightspeed can make it run at 600MHz. It can also speed up the system bus, from the normal 100MHz to 265MHz. Sony's latest NX units can go all the way up to 165MHz bus or 370MHz CPU. The settings can be applied by application or to all apps at once. There's also a power save mode that takes the NX devices down to 16MHz bus and 33MHz CPU speed. US\$19.95, www.clievideo.com —SAB

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Beaming Station 2 go

Who would want the ability to beam multiple files automatically and continuously from a "beaming station?" And wouldn't it be expensive to have such a thing? Not if you know about BeamPRO Expo, a program that transforms just about any pre-OS 5 Palm into a beaming station.

If you're interested in beaming a number of programs and files at the same time to anyone with a Palm, BeamPRO Expo from Ecamm Network (www.ecamm.com) lets you set it up and walk away and your Palm will beam the files automatically.

Set up is fairly intuitive and selecting files, programs, appointments, etc. is done by simply tapping a checkbox. If you have a large group of items that you'll need to select repeatedly, a Favorites category is available so you don't have to go through a lengthy setup process each time you set up your beaming station. Over the years since I first started using BeamPRO Expo, customer requests have influenced the addition of expansion card capabilities and the ability to beam to non-Palm OS devices like phones and Pocket PCs.

BeamPRO Expo takes up about 100K of RAM. BeamPRO (non-Expo) is a similar program with similar capabilities but doesn't offer unattended beaming. BeamPRO Expo uses system calls that require a pre-OS5 device to allow automated beaming, so don't plan to use your new T3 as a beaming station.

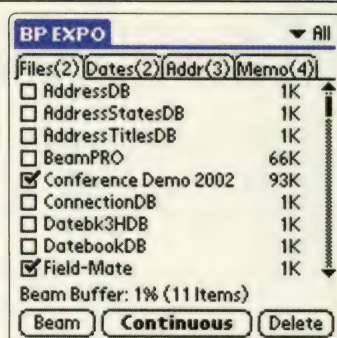
Trade shows, corporate offices, college classrooms, and anywhere people gather with Palm OS handhelds and want to share data are ideal environments for a beaming station. For a trade show environment you'll want to hook the Palm to a charger of some sort and lock it down in some kind of container so you can have a 'beaming station' that won't walk away.

As a trainer with hundreds of students in a classroom envi-

ronment, I've modified my beaming station to make it handheld. I set up the files and programs I want to beam and close my Palm in a RhinoSkin molded aluminum hard case which I've modified to expose the IR port. I tape the unit shut inside the case and pass it around to the

class and that way they all get the items I want to beam to them without having to visit a beaming station.

BeamPRO Expo is available from www.ecamm.com and costs US\$59.95 after the 30 day trial period expires. —Larry Becker



Better fonts for your NX

One of my most persistent complaints about the otherwise dazzling CLIE devices has been the razor-thin fonts. They've been with the platform since the company's switch to 320 x 320 displays, and while the sound effects and GUIs have only gotten better, there have been only a few improvements to the fonts. Now there's a program that allows you to change some of those razor fonts to fatter, more readable fonts: Fonts4NX. The interface is simple enough. Just install the software and launch the program. Up comes a menu of buttons with all the included fonts shown. Just tap to select

which one you want. The Sony CLIE version of the program includes three Handera fonts, Times Roman, Tahoma, SansSerif (a Univers-style font), and what they call "Tungsten T font." It's a close approximation, but not quite the same as the T's built in font. The good news is it's nothing like the CLIE's razor font. Unused fonts can be automatically stored on an expansion card until needed. The program is also available for other OS 5 devices (e.g.: Fonts4TT); and you can even choose that razor thin CLIE font for use on your palmOne device. www.palmgear.com US\$8 —SAB



Styli with style

Frequently it's the little things that make the handheld experience fun. Take the stylus for instance.

I thought that Palm Solutions Group did a great job with the spring-loaded Tungsten T stylus. Compared to the handheld itself, it's not amazingly high-tech but it was a decided departure from the typical plastic or metal/plastic stick. Very cool.

Leave it to the after-market vendors to make a good stylus even better.

I bought a stylus from Stylus Central where they call it a "Tungsten T 3 in 1 Stylus Pen with spring." And though it looks identical to the original Palm stylus, it has a ballpoint pen inside it. Just unscrew the writing end to reveal a nice little black ballpoint pen.

Holding an original stylus next to the 3 in 1 version, I'd challenge anyone to tell which is which. However, after you



use it for a little while you may notice a very slight difference. When in the collapsed state, the after-market stylus is just slightly longer than the original and therefore it protrudes an extra couple of millimeters. That might not seem like much, but it is something I noticed at first.

The good news is that, in several weeks of use I've never lost it and the extra little bit of length hasn't given me any difficulty at all. I even forgot about it until I pulled out my original stylus to compare them for this review.

As somebody who takes all things Palm very seriously, a good stylus is really important to me. Don't take it lightly when I tell you that StylusCentral's Tungsten T 3-in-1 Stylus Pen with spring is my favorite stylus and worth more than the US\$12.99 sale price. —Larry Becker

Proporta C&W cases

New case offers padding, crush resistance, plus SD slots

Proporta has done it again, with a few improvements. Their latest hard case is for the Tungsten C and W. Its chief advantage is that it provides hard protection without be-

other, but this one is better locked into place. There are holes for speaker, HotSync, and reset button, as well as a large open area at the top for SD, IrDA, stylus, and headset jack access. The

The case is padded inside to avoid scratching the unit, as well as providing some shock protection. Two spring loaded pads in the back nudge themselves into the Universal Connector openings on the back of the unit. This mechanism holds the device well enough that a drop won't release it.

While the case does not allow use of the HotSync cradle, the opening at the bottom is big enough for the Proporta USB charge and sync cable. Thumb typing is a little difficult with the case, because your right thumb has to wrap around the open door as you type. I would really like to see this crew try their hand at a flip top case, since flips usually get completely out of the way.

This new case offers such excellent protection that it's easy to forgive the device's SD card slot and power button being unprotected, but these factors should be considered by the prospective buyer. Overall, it's a good buy at US\$34.95. www.proporta.com —**Shawn Barnett**



ing bulky. The C by itself is a chunk, so you don't want to add much more to that. The door design is better than past models, in that it provides better crush protection. The case of the Tungsten T, for example, could give when the mating pieces of metal decided to slide past one an-

status light can be seen, and the antenna of the W has room as well.

Inside is a new feature I'd love to see them add to the other cases: SD/MMC card holders. This is an absolute necessity as we continue to do more and more with our devices.

Sony Clie UX50

We had planned on including a full review of the Sony's CLIE UX50, a device that's nothing short of a marvel. Unfortunately, our review unit arrived late, so there was only time for some initial comments.

The UX50 is both the return of the H/PC and the morphing of the Palm into something more powerful and functional while retaining the small size. For Sony it marks the entry of a new processor, specially made for the new communicator line. It borrows a lot of features from the NX and NZ product, with its flip and rotate screen, built-in keyboard, and 320 x 480 screen, but once again the world has been set on its side, with portrait orientation being dumped for landscape—far more logical for Web browsing and email composition. Also from the rotation comes a larger keyboard. The device comes in at about the same size as a Palm Tungsten T in a case, though a little wider; otherwise it's about as tall and thick. It weighs 6.2 ounces.

The new product features a breakthrough processor design, made by Sony in the same fab that makes the PlayStation 2 processors. They're calling it the Hand-held Engine (CXD2230GA). At its core is an ARM926, optimized to step its power usage depending on system demand, stepping way down to display an organizer screen, while ramping up for MP3 and Video, via what Sony calls Dynamic Voltage and Frequency Management. Its five hour expected video performance—at 30 frames per second—enables one to watch two full length movies on the device with the snap-on extended battery. The new chip also integrates a 2D graphics engine, digital camera, and nearly all of the I/O controls into a single chip, making the UX50's small size and impressive power possible.

Also built into the new device is Automatic Data Protection. When the battery drains to a certain level, all data is copied from the volatile 16MB RAM to a non-volatile 16MB set aside for the purpose. In addition to the 16MB RAM there are 29MB of non-volatile RAM set aside for loading user data, like videos, databases, and MP3 files. All one will need do in case the battery runs down is recharge and all the data should be safe, something PDA users have been waiting for.

The unit contains the usual stuff we've come to expect from the twist and flip line, including MP3, and a digital camera for stills and video on the hinge—in this case a VGA camera (300K pixels). It also includes something no other Sony Palm device has: both Bluetooth and 802.11b built in. So you can use WiFi in the office and at Starbucks, and your cell phone while away from these hot spots. Ideal. What we've all been waiting for.

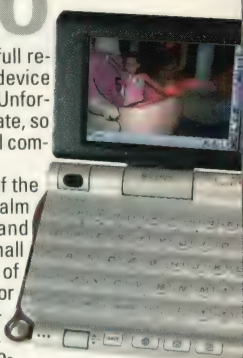
One of the obvious questions many will ask is whether the screen rotates to portrait mode; it does not. Instead, the Graffiti 2 area is stacked and off to the left or right, with the number entry area on top of the letter area.

The keyboard is waved, not unlike a drive in theater parking lot, allowing easier access to the keys. They've also included a number row across the top, something lacking on past Sony keyboards.

Across the front of the unit are a wheel for scrolling or pressing in to activate, and four buttons, for back, Web, email, and find. The stylus is accessed below on the right, and capture is under the screen. A cradle will be included, which is little more than a snap-on plastic base that only charges. A separate cable is included for HotSyncing, which attaches at left next to the power switch. Perhaps Sony is expecting a lot of users to wirelessly hot sync with either Bluetooth or 802.11b, which are built into more and more PCs.

New software features include quick access to files by tapping on the Memory Stick icon, which launches the file manager, and quick status check of the battery, also by tapping on the icon. The reset button is easily activated by the stylus tip, thank goodness.

Sony never ceases to amaze with these products, so I'm fairly out of superlatives. This is their first product to dazzle with both features and size, however, and will compete for a lot of pockets. Sony representatives assured me that this is only the beginning of what will be their communicator line. In addition to the UX50, Sony will offer a UX40, which will have only Bluetooth technology. The UX50 will be US\$700 and the UX40 US\$600. You can pre-order them on the website. <http://www.sonystyle.com> —**Shawn Barnett**

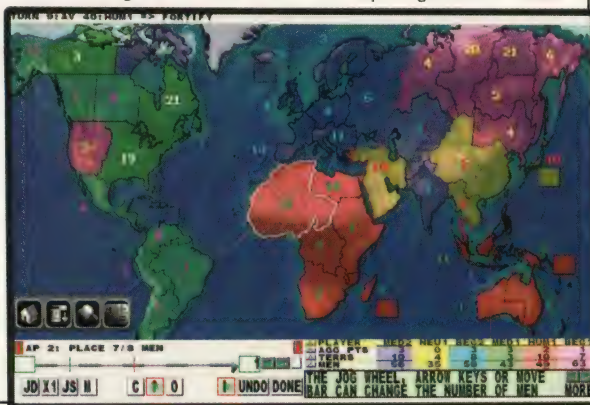


Aggression possesses

That same feeling of adrenaline came back from so many years ago, when I played much older kids at the game of Risk. Then it was a board game, but now it's another great way to use my NX80V. The 320 x 480 screens on these clamshell CLIEs are unbeatable for a game of world domination. Up to six can play, including different levels of automated opponents. You build up your armies and set out to dominate the planet.

This is not a game that you just press a few buttons to win, but spend about 10 minutes reading the manual and

you too will soon be sweeping whole continents with the stroke of a stylus. US\$11.95 www.palmgear.com —**SAB**



Salling Clicker

Software transforms your Tungsten T into a Mac remote

An unexpected innovation hit my desk recently, one of those that helps bolster my confidence in the promise of Bluetooth, the Personal Area Network we've heard so much about. It's a software application called Salling Clicker that allows a Palm Tungsten T or Sony Ericsson T68i user to remote control a Bluetooth-enabled Apple Macintosh. Seldom does an application promise a lot and deliver it so well. In fact, it even does some things better than my Mac's built-in hardware.

It was version 2.0 of Clicker that enabled the Palm Tungsten T, and it's a natural marriage. Though I have a T68i as well, which I use for mobile internet access on both my iBook and T, I haven't tried it with that; the Palm experience is so satisfying I don't know why I would. Truly, it's probably not something I'll use much, since I don't do presentations often, but for those who do it's a great tool. Powerpoint tools are basic, allowing scrolling through your slides. If your presentation has notes, as any good presentation should, they will be displayed on the handheld, so you can move around the room as you occasionally glance down at notes displayed on your remote control (in case you haven't heard, merely reading the words on your presentation slide does not make for a good impression; most audiences can read). But that's not all Clicker can help you control.

iTunes is probably its other more compelling application. You now both dance and DJ your next party from the T. Just jack your Mac into the stereo and link your T with Clicker. You can search for specific songs, albums, artists, or just set iTunes to shuffle. The current and next three songs are displayed on the Palm. You can skip songs with a tap, scroll back and forth, and raise and lower the volume all with the T's Nav disc (and it's the volume that works considerably faster than my iBook's keyboard controls). Elapsed and remaining time are counted on-screen. I can't find a scratch function, so not all DJ's will like the solution, but it's still pretty cool for impromptu parties.

Because the program can be extended by users with AppleScript, it can be used to remote control all manner of applications. Artists who use Macs in their performances will likely go completely crazy over this product.

Bundled scripts include the ability to remote

control the computer's DVD player, the iPhoto app, Keynote (Apple's presentation software), and QuickTime Player. The DVD automatically pauses if you're controlling it with the T68i and a call comes in, by the way. Pretty thoughtful.

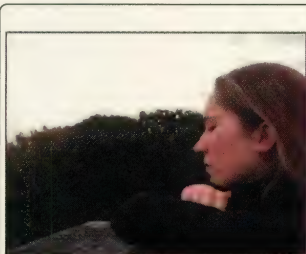
The desktop application runs as a component of the System Preferences dialog. New actions can be downloaded from the Salling

Clicker website when they are available. The first one is a script that controls Indigo, an

X10 controller software

that will allow users to turn off the lights in their house remotely and receive messages about sensor alarms on their mobile phone, just as an example.

It's an impressive application. I was able to set it up and begin experimenting in minutes. Just another great Palm and Mac app that most Windows users will not know about (though they should look up the Pebbles PDA Project). Meanwhile Mac OS X users can have even more fun with their favorite computers for a mere US\$15 (US\$10 for T68i version). **-SAB**



Done Help

Salling Clicker

Track: Radian
Artist: Air
Album: 10'000 Hz Legend
Elapsed time: 00:00:06 / 00:07:37
Remaining time: 00:07:31 (playing)



Done Help

Make it stick with egrips applique

Slippery devices will stick with colorful custom grips

Most electronic gadgets today are designed to look cool. This usually means they have slick bodies that look great—and slide right out of your hand.

It's a criticism especially made by men with working hands, rough and lacking the stick many are used to; even so, even the stickiest hands have trouble holding onto a small device like the Sony Ericsson T68i. I was just about to go get some sandy grip tape from the local hardware store, like the kind I used on my skateboard as a kid, when I discovered Egrips at an Apple store. These are rubbery little grips that are cut for a large variety of devices. It so happened that they had one for my T68i and Palm Tungsten T, so I ordered them. Not bad.

I shouldn't have picked the elephant skin pattern for the T68i. I just couldn't resist the contrast it offered; now I can. It would have gone great with my Siemens S46, though. Regardless of its appearance, it sure does give the little device better grip, and far less of a ten-

dency to slip out of my hands. And it sticks to other surfaces very well, staying in place even up to 45 degrees and beyond. With my headset attached, I set my T68i on my curved dashboard for better reception. Hard stops, fast cornering, and bumps don't remove it from its place. Pretty amazing. I find I think differently about my devices, more sure that they'll stay put when I set them down. It's a good feeling.

Egrips cautions that you shouldn't push an Egrips-equipped device across a surface, because you might just pull the grip from the adhesive. That's how good this stuff grips. It doesn't absorb oil, nor does it gum up with dirt. I did notice a little fuzz sticking to the adhesive on my T68i after I'd set it on my cloth car seat. But it didn't stick to the grip surface, just as they promise. Finally, it doesn't gum up your device if you decide to remove it. All adhesive removes cleanly. Egrips even seems to suggest that you can swap them for fashion's sake. For the price, some might just be tempted:

US\$9.95, plus US\$1 for dimpled, then another dollar for colors and textures. www.egrips.com **-Shawn Barnett**



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00504



00502

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00308



00321



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Leather FlipCase 00366 **\$34.95**

00375



00366

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00373



00320



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Leather FlipCase 00329 **\$34.95**

00402



00329

Palm™ Zire 71

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Palm™ Zire

Blue FlipCase with black trim 00332 **\$14.95**

00406



00332



Sony Clie PEG-SJ22

Aluminum HardCase 00356 **\$34.95**
Leather FlipCase 00312 **\$34.95**

00356

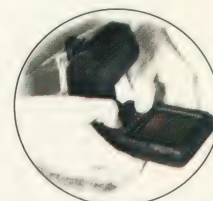


00312

Rim Blackberry 5810, 957, 857

Leather FlipCase 00105 **\$39.95**

00105



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OtterBox Armor

Make your PDA a rugged computing tool for just US\$100



There are many applications where you'll only want one of the truly rugged handhelds regularly reviewed here in *Pen Computing Magazine*. But there are plenty of instances where a rugged housing around a standard PDA will do just fine, and meet the company budget, often even stretching that budget to include more handhelds.

The folks at OtterBox have come up with a new case that takes after-market ruggedness to new heights. It's the Armor 3600, designed to work with all PDAs. Its rather large rubberized body is hourglass shaped, which maximizes impact resistance while still allowing the case to fit in most hands. Across the back is a neoprene hand-strap that further enhances your ability to hold the case in one hand.

It is a two-shell design, held together by four cam-lock clamps situated at the four corners. A silicone gasket, if kept

clean, keeps water out. The front opening measures 4 7/8 inches by 2 7/16 inches, enough to fit the full screen of a Sony CLIE NX device, plus buttons and camera. A clear, flip-up plastic door guards the opening, and moves out of the way to reveal a clear write-through membrane that keeps the case water-tight while offering normal access to the touchscreen available on most PDAs.

I tested it with several PDAs, and it worked better with shallow-mounted screens like the NX80. I had trouble in the corners with PDAs like the Tungsten T, whose screen is mounted more deeply in the front bezel. Tungsten C and W owners will find that the screen opening is not quite big enough to prevent the outer keys on the built-in keyboard from activating. Were it made just a little wider it would be no problem to activate the keys with a stylus.

An empty stylus slot is molded into the rubber left of the screen.

The four cam locks can be secured with a screw for extra security. Opening these latches allows the back shell to come away, revealing the soft foam pad that is used to hold the product securely in place. Removing this

device to fall free, however, as is possible in other models. The PDA is instead held in place by two velcro straps that crisscross one another.

It is an impressive case. But there's a lot more. Many field ap-

plications require more than just the PDA. Some require external GPS units, laser scanners, battery packs, and hard-wired connections to external devices. The 3600 is ready.

The optional Deep Box kit comes with an additional back shell for accommodation of thick battery packs, like the Compaq iPAQ sleeves, for an additional US\$50. Top and bottom of the unit are clear plastic doors that can be used for beaming, and can be removed to allow attachment of case extensions. The big, clear CF POD provides extra room for a radio, GPS, or laser scanners.

Two other expansion modules are available, one that allows cables of various sizes to pass through and connect to the PDA, and one that offers a blank plate for users to add their own connector type, called the Through-the-Box Connectivity Kit (US\$39.95) and the Through-the-Box POD Kit (US\$34.95) respectively. As an example of what's possible with the POD Kit, they offer a Serial POD Kit with a DB9 connector built in (available in October 2003).

The most obvious necessity is that Connectivity Kit, because it allows you to attach a car charger and keep the PDA working in the roughest environs. Just two allen screws open the adapter, and you select from the bank of sizes to fit the cable just right. The only problem can be when your PDA connector is too big to fit through the opening. I couldn't fit most charge-n-sync connectors at my disposal; however, some of them connect to a car charger module via a stan-



dard USB connector, which does fit through the opening, so users would just need to try a different cable and route it this way.

Other accessories include the Neck Lanyard Kit (US\$29.95), a well-padded OpTech strap that makes the Armor 3600 feel surprisingly light around your neck. There's also a belt clip (US\$19.95) and even a sealed Otter carrying case called the Armor Travel Case for both your Armor 3600 and the devices you use to protect it. Price for this relatively big box is US\$69.95. Not bad.

The one weak link is also a replaceable item: the write-through screen membrane I mentioned earlier. Naturally this is going to wear out, so it and its locking gasket can be replaced for US\$12.95. With the exception of PDAs like the NX80—which pretty well covers the entire opening—direct finger pressure can push this membrane open, releasing the light pressure offered by its O-ring retainer. It makes me wonder if changes in altitude combined with weather change might work the membrane loose with an increase in pressure, as is offered by a quick drive from the Sierras to the San Francisco Bay (an easy three to four hour trip). This just reinforces the need to recheck your armor when you enter a new environment, because much can change. I don't think it's a big issue, but users should be aware of the possibility. Opening the case and pressing the O-ring back in reseals the box.

The good news is that it's an inexpensive replacement item, as is true of all the accessories in this Armor system. Even the various mounting kits are reasonable, including a handlebar mount for US\$15, and a permanent mount kit for US\$20.

If you're at risk of a minor fall or of dropping your device while occasionally collecting data in the field, you might look at the Otter-Box Armor 2600 as well, which offers reasonable protection in a smaller package; but if your PDA is subject to abuse and the data is critical, you need an Armor 3600. It's the first serious protection for PDA use in the real world.

—Shawn Barnett

Here's looking at you, kid

Apple revolutionizes video-conferencing



icon next to their name and picture in iChat AV's list of my buddies. Sure beats playing phone tag, and it's far more satisfying and efficient than e-mail for many type of exchanges. If you need to get someone's feel for a situation, using an iSight lets you see it in their eyes, presented with all the non-verbal cues homo sapiens have perfected over hundreds of thousands of years of evolution. When you're attempting to convey a subtle point, text is good, voice is better, but nothing beats eye to eye.

It must be tremendously satisfying to work for Apple Computer. While other technology companies try to change the world, Apple truly does—and does so consistently.

Take their new US\$149 iSight desktop videoconferencing camera. Working in conjunction with the (currently) free iChat AV software, I have finally realized the dream of the picturephone I've been expecting since 2001: *A Space Odyssey* hit the big screen in 1968. The big difference is that it comes not from AT&T, as in the film, but from Apple. Even better, the call is free—provided you have a recent vintage Mac running the latest version of Mac OS X, that is.

To be fair, there are other personal computer-based audiovisual communication systems available and they've been out there for some time. I've been trying to get various lash-ups to work, on both PCs and Macs, for more than five years now with consistently miserable results. What makes Apple's new AV solution so appealing is that it just works; you plug it in, install the software, and it goes. The only problem is finding someone else with which to converse. The solution to that last bit, of course, is

to buy one each for home and office—then convince your best friends and close family members to do likewise. (Talk about your viral marketing!)

For those whose work takes them far from family and friends, a pair of Macs and two iSight cameras can make all the difference in the world. With some form of broadband Internet connection at both ends (cable modem, ISDN, office LAN, WiFi hotspot at Starbucks, or whatever) little Sadie in Seattle can see daddy as well as talk to him as she gets ready for bedtime—even if he's in Buenos Aires that day.

For corporate offices, the potential uses for such an easy-to-install, easy-to-operate communications tool are compelling. For example, in my building we have departments on most floors of a six-story building. Oftentimes in the course of my work day, I need to see someone but would rather not take five or more minutes to ride the elevator, deal with the security pads, chit chat with other colleagues I meet along the way, and so on. Sure, I could pick up the phone, but iChat AV is better since I can see in advance if the person is at their desk and if they have their camera on; there is an

A real looker

The iSight camera is an attractive piece of work; a drilled-out, swivel mount aluminum tube with three included stands for easy, non-permanent attachment to a flat panel, a CRT, or a portable Mac. The modern 2.3-ounce device is connected with a single FireWire cable (included) that provides both a 400Mbps data connection as well as power to the camera. The 640x480 pixel resolution and TV-quality 30 frame-per-second performance are ideal for desktop AV communications. The iSight has a top grade, dual-element condenser microphone that samples sound in stereo, analyzes the sources of nearby sound, then cancels out extraneous noise. The resulting audiovisual presentation is far better than anything else you can get without spending big bucks on a dedicated videoconferencing system.

Apple may not have invented the picturephone, but they made it work so simply and reliably that anyone can use it. In five years, high-quality, idiot-proof videoconference cameras will be clipped to every computer, but why wait when you can have one now?

—David MacNeill, editor-at-large



by C. M. Blickenstorfer

WE GOT WHAT WE NEED

Solid rather than sexy: Windows Mobile 2003 adds stability

Well, the big update to the Pocket PC software platform happened, and most people likely didn't even notice. It's no longer Pocket PC 2002. It's now Windows Mobile 2003 for Pocket PC. No one can ever accuse Microsoft of strict (or any) naming consistency for their operating systems, but in the end it really doesn't matter.

I must admit that I had hoped for some substantial changes and improvements in Pocket PC, like the ones we saw during the early days of Windows CE where the platform went from a bare, spartan, utilitarian micro OS to a rich, elaborate platform supporting SVGA and all sorts of peripherals on the hardware side and adding all sorts of wonderful application functionality on the software side. Instead, Windows Mobile 2003 for Pocket PC is to Pocket PC 2002 a bit like Windows 3.1 was to Windows 3.0. 3.0 was the first version of Windows truly ready for prime time, just as Pocket PC and Pocket PC 2002 were the first version of Windows CE that was almost universally accepted as a solid, useful platform. Yet, while Windows 3.0 laid the groundwork, it was Windows 3.1 that became the stalwart of computing for several years, until the next big step, Windows 95. Windows 3.1 wasn't revolutionary. It simply provided a much more solid underpinning, fixed a bunch of stuff, and generally provided the kind of reliability and functionality that real people in real jobs needed to do real work.

Likewise, while Windows Mobile 2003 doesn't look any different and doesn't seem to offer a lot of new features, it is an entirely more solid platform that quietly and competently does where Pocket PC 2002 struggled. When Microsoft officially announced Pocket PC 2003 back in June, I commented that while the new version may not be what a lot of people wanted or expected, it was what we needed. I still feel that way. For a detailed description of Windows Mobile 2003, see Technology Editor Geoff Walker's article starting on page 60.

Does this mean I am entirely happy with things? No. Palm has caught up in way too many areas and moved ahead in some, and that's simply not the way it ought to be. I am definitely jealous of that endless variety of software available to Palm users, all the many form factors, the innovation Sony brings to the table, and, most of all, the higher resolution of many Palm products.

Resolution definitely matters. All the speed and wireless connectivity and improved browsers in the world don't mean a thing if you still have to peek at the web through a tiny 240 x 320 pixel pinhole. So yes, I continue to be baffled why Microsoft Pocket PC does not support VGA or at least half-VGA resolution at this point. It simply makes no sense at all.

On the hardware side we're seeing some interesting shifts. First, while the Palm platform continues to clearly rule the consumer markets, Windows' dominance in vertical markets is even more dramatic. With the exception of a couple of Palm-based handhelds developed by Symbol, Windows has the same stronghold on the vertical handheld market as it has on desktops and notebooks. It was never even a contest.

But there are changes in the consumer market as well. While I wouldn't go as far as saying that Microsoft has conceded that market entirely, it is becoming very clear that Pocket PCs are for business first and for rank-and-file consumers second. That's evident in the changes made in Windows Mobile 2003 which are almost exclusively for the benefit of corporate users. It's also evident by looking at who dominates the Pocket PC market these days, as there has been a major shift in that arena as well.

In the early days Microsoft-based PDAs and handhelds were available from almost all of the major electronics giants (Casio, IBM, NEC, Philips, etc.) and a number of challengers trying to gain a foothold in what was seen as possibly the next big thing. That has changed. While there is still a good

Hewlett Packard practically owns the market. Dell and Toshiba come on stronger and stronger, but as of now HP has their number. The rest are independents or peripheral manufacturers like ViewSonic. It's as if Pocket PCs have morphed into optional (and likely quite profitable) PC add-ons.

That's not necessarily bad. Hewlett Packard, in particular, is really impressing me with its seemingly never-ending flurry of new and improved iPAQs which has expanded into a whole family of products. The top-of-the-line iPAQ 5000 Series is about as functional and mature as they come, with the large display/wireless/Bluetooth/fingerprint scanner-equipped h5550 securely positioned as the road warrior's perfect PC away from the PC. For those who need something lighter smaller there is the 1900 Series, devices so small and light and elegant that they appeal to more than just corporate types. My personal favorite is the iPAQ h2200, smaller than the big 5000 Series machines and more powerful than the little 1900s. In fact, the HP iPAQ h2200 is my Pocket PC of choice these days, the one I take home every night and keep all my data on.

However, apparently not content with just these three lines of great Pocket PCs, Hewlett Packard recently introduced a fourth, the 4000 Series. That series consists of two models so different that it is not entirely clear why they share the same Series number. The iPAQ h4155 might as well be called a h1975 because it looks and feels just like a high-end 1900 Series product. The iPAQ h4355 is an entirely different matter. It is the first iPAQ with an integrated RIM-style thumbtype keyboard. Specs are roughly the same, but the addition of the keyboard gives the 4300 a very different look and makes it a good inch longer as well. This strategy seems eerily reminiscent to when, what seems like eons ago, Handspring introduced a set of Treos, one with and one without an integrated keyboard.

With the h4355 the Pocket PC concept has come full circle. First we thought PDAs didn't work because they had no keyboard, so we got little clamshells. Then Palm showed that PDAs work anyway. Then RIM showed that tiny keyboards also work and soon they popped up on PDAs. So now we have tiny PDAs with tiny keyboards. 

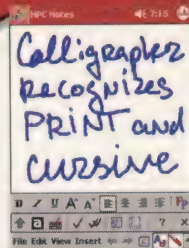
Those who expected Pocket PC 2003 to be a flashy new revision are disappointed. Windows Mobile 2003 concentrates on stability and corporate functionality instead. Nothing wrong with that.

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CalliGrapher gives you the freedom to enter information quickly and efficiently into your mobile device. CalliGrapher adds natural handwriting recognition capability to your Microsoft Windows-powered Pocket PC and Handheld PC Professional for all handwriting styles - cursive, PRINT or Mixed. In addition to support for English, CalliGrapher now supports handwriting recognition in Dutch, French, German, Italian, Portuguese, and Spanish languages, bringing an increased international capability to Pocket PC users.

Our New Medical Dictionary adds a 130,000 word, professional-strength English language medical dictionary for PhatWare's CalliGrapher and PenOffice handwriting recognition products.



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"If you have any Windows-based pen computer, you need PenOffice."

Conrad Blickenstorfer, *Pen Computing*

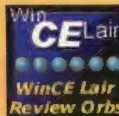
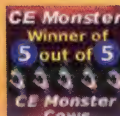
"I wish CalliGrapher was installed on my device when I first bought it instead of Transcriber and think this program would have given new owners a better handwriting recognition experience that may have resulted in more people using this method."

Matthew Miller, *Pocket PC*

PhatWare Corporation

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FEATURE

Bye bye Pocket PC 2002, **Hello Windows Mobile 2003 for Pocket PC.**

Those who see Windows Mobile for the Pocket PC for the first time won't notice much of a difference between it and Pocket PC 2002. That caused an industry columnist to quip that Microsoft appears to view Pocket PC as a "mature" platform without further need for refinement. While it *DOES* look that way, it is only half the truth. The new version of Pocket PC/Windows Mobile sits on top of Windows CE .NET 4.2, a far more competent basis than the old Windows CE 3.0. In addition, Microsoft has added numerous important features, improvements, updates, enhancements under the hood, all geared towards making the Pocket PC a better, stronger, more reliable platform that fits more seamlessly into overall corporate systems and Microsoft's .NET strategy than ever before.

By Geoff Walker



Surprise!

MICROSOFT

AGAIN PLAYS THE NAMING GAME

IT'S NOW

WINDOWS Mobile 2003 for

POCKET PC

This article examines Microsoft's latest operating system for the Pocket PC from several perspectives – user features, enterprise features, software compatibility, performance, upgrades, the underlying embedded OS and program development.



THE NAME GAME

"Windows Mobile 2003 for Pocket PCs" is Microsoft's new name for the Pocket PC operating system. Why isn't it just "Pocket PC 2003"? Because Microsoft is trying to put its Pocket PC and Smartphone mobile devices under a single brand, to more closely connect the devices to the brand with which most people are familiar – Windows. Microsoft is trying to reinforce the impression that your Pocket PC is an extension of your Windows desktop. It will take some time to see if the Windows Mobile name sticks. So far, the media appears to be using the new name about half of the time, but major OEMs such as Dell, HP, Toshiba and ViewSonic are all using the term "Pocket PC 2003" on their product websites. I'll do the same thing in this article.

Windows CE .Net (now at version 4.2) is being positioned more clearly as an embedded operating system. "Embedded" means that the OS isn't meant to be seen by users; Windows CE .Net and XP Embedded both fall under the "Windows Embedded" brand. Windows Embedded is for developers, and Windows Mobile is for users. Actually, Pocket PC 2003 is built on top of Windows CE .Net 4.2 (more on this later).



NEW USER FEATURES

From a user perspective, Pocket PC 2003 is somewhere between a "dot" release and a major overhaul. It includes some significant changes that improve the overall user experience, and a number of minor tweaks. The notable changes are explained briefly in the following paragraphs.

Zero Wi-Fi Configuration: Windows XP's automatic Wi-Fi (802.11b) configuration has been added to Pocket PC 2003. This means that whenever your Wi-Fi enabled Pocket PC encounters an active network, you're asked if you want to connect. Once you connect, the settings are saved so that the next time you're in range of the same wireless network, all you have to do is say "Yes." The result is that you can move easily between wireless networks. (Note that a new Pocket PC 2003 driver for your Wi-Fi hardware is required to make this work. The same automation also applies to modem and wired LAN connections.) To help publicize this feature, Microsoft has entered into an agreement with T-Mobile HotSpot, Boingo Wireless and Wayport to provide free wireless hotspot usage for 30 days for new Pocket PC 2003 owners.

Native Bluetooth Support: Support for Bluetooth (PAN) wireless is now built into Pocket PC 2003. This means that if you have a Bluetooth-enabled cellphone (for example), you can use it as a modem to access the Internet with your Bluetooth-enabled Pocket PC. You can also beam data such as contacts to other Bluetooth-enabled devices.

Updated Internet Explorer: Pocket Internet Explorer in Pocket PC 2003 is upgraded to match the standards support and capabilities of IE 6.0. This includes (among other things) HTML 4.01, XML, XHTML (Basic and 1.0), Cascading Style Sheets, Wireless Markup Language 2.0, JScript and VBScript 5.5, WTLS, IPv6 (Internet Protocol version 6) and animated GIFs. This means that it's once again possible to design websites that conform to the latest web guidelines and which will work properly and look good on a Pocket PC.

Windows Media Player 9 Series: The Pocket PC 2003 media player is now at the level of the latest Windows XP player. The result should be smaller media files on your Pocket PC, smoother playback and the ability to play a wider range of files. Using this player, you can play back local or streaming broadband content at up to 300 Kbps.

Image Viewer: A new digital imaging application called "Pictures" is included in Pocket PC 2003. It allows viewing images individually, as thumbnails or as part of a slideshow. You can also do simple editing (rotation, cropping and adjusting the brightness & contrast) right on the Pocket PC.

Enhanced Messaging Support: When you're writing an email, email addresses are automatically drawn from the Contacts database as you type them, common spelling errors are automatically corrected as you type, and your signature file is automatically appended to the message.

Enhanced Contacts: Typing any portion of a contact's first or last name brings up the contact's information; vCards are now supported for better integration with desktop Outlook.

Enhanced Calendar: The calendar now includes multi-day views with weekends and holidays highlighted in different colors, making it easier to see your free time (if you have any). VCal's are now supported for better integration with desktop Outlook.

Pocket MSN: A new Pocket MSN application includes support for MSN Messenger, MSN Hotmail, Alerts and Mobile Web.

Jawbreaker Game: A "new" game called Jawbreaker is included. The game, similar to the PC game "Collapse! II" from GameHouse.com, was originally written for Palm OS by Oopdreams.com; it's still available under the name "Bubblet".

Active Sync 3.7: The Pocket PC 2003 bundle in-

cludes the latest version of Active Sync, which delivers improved USB support and support for wireless synchronization via Wi-Fi or Bluetooth. Pocket PC 2003 requires this new version; you can't use an older version to sync with a Pocket PC 2003 device.

Keyboard Support: Pocket PC 2003 now supports integrated or external keyboards. Keyboard shortcuts for menu commands and navigation are also included.

What's missing? One obvious thing is any enhancements to the built-in applications such as Pocket Excel and Pocket Word (with the sole exception of a spell-checker added to the latter). These applications are still very weak. For example, if a Word document contains fonts not available on the Pocket PC, Pocket Word chooses the closest substitute, which seems reasonable. But if you edit the document and send it back to the PC, the original font selections are lost. Any tables included in Word documents are mangled by Pocket Word beyond recognition or repair. Pocket Excel still cannot generate or display graphs. Maybe Microsoft will eventually realize that Palm and third parties solved all these kinds of problems years ago.



NEW ENTERPRISE FEATURES

The 2003 version of Pocket PC maintains its substantial lead over Palm OS as the best operating system for the enterprise (ignoring ease-of-use issues, of course). Pocket PC 2003 includes even more features that are important to enterprise users, such as the following:

Virtual Private Networks (VPN): Microsoft has added Layer 2 Tunneling Protocol & IP Security (L2TP/IPSec), and encryption using 128-bit SSL and/or 128-bit CAPI to the Pocket PC VPN Client. This high level of security is used in Windows Server 2003 and in other VPNs from vendors such as Cisco. Using the completely re-designed Con-

*"Windows Mobile
2003 for Pocket PC
may not be what a lot
of people wanted or
expected, but it sure is
what we all needed."*

*Conrad H. Blickenstorfer
Pen Computing Editor-in-Chief*

WINDOWS MOBILE 2003



nection Manager, a Pocket PC 2003 user can configure multiple VPNs.

Wi-Fi Security: Microsoft has added support for IEEE 802.1x in Pocket PC 2003. 802.1x uses a digital certificate stored on the Pocket PC to authenticate the user connecting to a Windows 2000 or 2003 Server. Pocket PC 2003 also supports Protected Extensible Authentication Protocol (PEAP) and Extensible Authentication Protocol Transport Layer Security (EAP-TLS) as part of the support for 802.1x.

Pocket IE Digital Certificates: Network administrators can install root and local digital certificates to allow specific Pocket PCs to access secure websites. Microsoft includes some basic root certificates as a bonus.

Support for Outlook Web Access: Pocket IE 2002 was totally unable to handle Outlook Web Access (OWA), which is often seen as critically important for email in the enterprise. OWA works very well in Pocket IE 2003.

Real-Time Communications Server Support: Pocket PC 2003 includes support for the MSN Messenger client with Microsoft's Real-Time Communications (RTC) Server and/or Exchange Server 2003.

Host Request Control: Pocket PC 2003 allows controlling where requests are sent based on the name of the host. In addition to a simple default, network administrators can set up special mappings to tell the Pocket PC whether to use the Internet or the Enterprise ("Work") connection to find a specific host.

Internet Protocol Version 6 (IPv6): IPv6 allows the Internet to support a very large number of additional IP addresses. IPv6 is just beginning to be implemented today in Asia. With the inclusion of IPv6, Pocket PC 2003 can support mixed IPv4 (current) and IPv6 (future) networks.

Terminal Services Client: A tool bar has been added from which you can jump to one of the cor-

ners of the virtual desktop or to the center. This is a simple but very helpful addition, given the limited real estate of the Pocket PC's quarter-VGA screen.

What's missing for enterprise? Very little!



Pocket PC 2003 is available in two configurations, called the Professional and Premium Editions. The latter includes Microsoft Reader, Terminal Services Client and Pictures. Typically the Premium Edition is offered on Pocket PCs with 32 MB or more of ROM, while the Professional Edition is offered on Pockets PCs with 16 MB of ROM.

Also available is the Plus! Digital Media Edition (DME) Pack (\$20 street). This add-on software allows you to play back PhotoStory files using Windows Media Player. PhotoStory allows users to create custom slideshows with panning, zooming, titles, credits, narration and background music. The audio and video content of the slideshows can then be updated via synchronization. The Plus! DME Pack also includes Plus! Sync & Go, a feature that makes it easy to synchronize desktop music and video playlists with the Pocket PC, as well as synchronize information directly from providers such as MSNBC, USA Today, CBS MarketWatch, NPR and Comedy Central.

The Pocket PC Phone Edition (which isn't actually shipping yet) includes the following new or improved features for voice-and-data devices:

- GSM/GPRS & CDMA support, including suspend & resume
- Scheduled synchronization with Exchange Server 2003
- Enhanced SMS and MMS support
- WAP support
- Direct caller ID
- Call forwarding and call barring
- Easily accessible phone dialer
- Speed dialing
- Speaker phone capability
- Separate ring and voice volume controls
- WAV, MIDI or Windows Media file ring tones

- Call log
- Call notifications

The first two bullets above provide a significantly improved wide-area wireless experience. The GPRS suspend and resume feature allows a GPRS-enabled Pocket PC to stay connected all day ("persistent connectivity"), even if the device is powered off during part of the day. It automatically reconnects if it's disconnected. This improved connectivity allows the Pocket PC to function somewhat like a RIM Blackberry device. Email can be configured (for example) to synchronize with a Microsoft Exchange Server mailbox through Server ActiveSync every five minutes during peak time. The Pocket PC can be set to vibrate whenever new mail arrives. During off-peak, synchronization can be set to a much lower frequency, such as once per hour. If you want to decrease the amount of amount of data that's sent to the Pocket PC, not only the synchronization frequency but also the amount of each email message that's synchronized to the device can be reduced (by default, the first 500 bytes of each email message are downloaded).

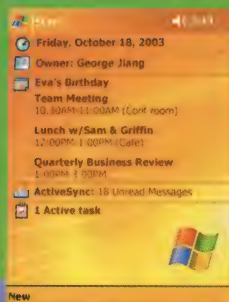


Pocket PC 2003 is generally backward compatible for existing Pocket PC 2000 and 2002 applications. However, because of the change of the underlying OS from CE 3.0 to CE 4.2, not all existing applications will run. An unofficial but often-updated list of 175 tested Pocket PC applications can be found at <http://www.manueldelatorre.com/ppc2003/index.asp>. Of course, if you want to take advantage of new functions such as IPv6 or the zero configuration wireless, you need new drivers and/or new applications. However, software designed and optimized for Pocket PC 2003 will not be compatible with older Pocket PCs.

Microsoft offers a database conversion wizard for Pocket PC 2003 on the Windows Mobile PowerToys website (see <http://www.microsoft.com/windowsmobile/resources/downloads/pocketpc/power toys.msp>) that could save you a little grief. Of the nine other downloads available on this site, one of the more interesting ones is "Remote Display Control". This utility allows you to display actions on a Pocket PC, including user input, on the display of a desktop or laptop PC. This is very useful for demonstrating Pocket PC applications to a large audience.



In August 2003, the PDA Gold website reported the results of upgrading a 400 MHz Compaq iPAQ



h3970 from Pocket PC 2002 to Pocket PC 2003 (see <http://www.pdagold.com/articles/detail.asp?a=89>). Before-and-after benchmarks were run using the Spb Benchmark program (see <http://www.spb-soft.com/products/benchmark/index.html>), with the following results:

Spb Benchmark Test 2003 Speed Increase	
Benchmark Index (system)	15%
CPU Index	51%
File System Index	-22%
Graphics Index	37%
Active Sync Index (USB 1.1)	38%
Platform Index (user view)	39%

Overall, Pocket PC 2003 definitely provides a performance boost over Pocket PC 2002. According to the tester, the final value of 39% seems to be a realistic assessment of the overall performance increase he sees. The File System Index result may be an anomaly, since it is the result of a single test: displaying the contents of a folder with 2,000 files.

Roughly similar results were reported by the Pocket PC Thoughts website, using a 206 MHz Compaq iPAQ 3650 (see <http://www.pocketpc-thoughts.com/articles.php?action=expand,16788>).



UPGRADES

All Pocket PC 2002 devices are technically upgradeable to Pocket PC 2003, but it's actually up to the individual OEM whether they will choose to offer an upgrade. (See <http://www.petitiononline.com/e300e740/petition.html> for an interesting petition about the lack of upgrades for certain Toshiba models.) Original Pocket PC 2000 devices cannot be upgraded to 2003.

Typical upgrade prices are in the range of \$30 (Dell and HP) to \$50 (Toshiba). If you purchased certain Pocket PC 2002 models between May 23 and September 23, Microsoft and some of the OEMs are cooperating on a "Technology Guarantee Program" which provides an upgrade for only \$16.

Should you upgrade your current Pocket PC device? If you're a heavy wireless user, an enterprise user looking for better security, or a multimedia enthusiast who wants an improved mobile experience, then you should definitely upgrade. If you're a traditional PDA/PIM user who's happy with the current functionality of your Pocket PC 2002 device, then there's no compelling reason to upgrade, other than possibly the improved performance.



WINDOWS CE AND POCKET PC

Pocket PC 2002 (launched in Fall 2001) was built on top of Windows CE 3.0 (launched in Fall 2000), which after three years in the marketplace was

getting rather old. Pocket PC 2003 (launched in Summer 2003) is built on top of Windows CE .Net 4.2 (launched in Spring 2003). The extensive differences between CE 3.0 and CE 4.0 were detailed in an article in the April 2002 issue of *Pen Computing* (see <http://www.pencomputing.com/WinCE/dotnet.html>). The minor enhancements in versions 4.1 and 4.2 included IPv6, L2TP/IPSec, IE6, file viewers, speech API and improved performance.

By the way, Pocket PC 2002 and 2003 have exactly the same minimum hardware requirements. They both support only ARM CPUs and portrait-mode quarter-VGA (240 x 320) screens. Windows CE 4.2, on the other hand, supports a wide range of CPUs and screen resolutions.

All of the improvements between CE 3.0 and 4.2 can be generalized as (1) enabling new user functionality, (2) improving performance, or (3) keeping up with hardware, software and communications technology. Without all three of these factors, developers won't write new applications for Pocket PC, and users won't keep buying new hardware and software. Keeping the Pocket PC's underlying OS up to date is as necessary as putting gas in your car.

One interesting side effect of Microsoft's waiting so long to update the underlying OS is the mismatch it created between systems and peripherals. Many vertical market devices are built with Windows CE rather than Pocket PC – for example, Casio's rugged handheld terminals (see <http://www.casio.co.uk/mobility/products.asp>), many of which use CE 4. But handheld peripheral manufacturers are driven mostly by the much larger Pocket PC market, which until just a few months ago was stuck on CE 3. Casio users searching for peripherals such as video projection interfaces therefore found nothing available, since essentially all of the peripherals were designed to support only CE 3. Now that Microsoft has finally updated Pocket PC, the logjam is broken and peripherals are beginning to be available for CE 4. Hopefully Microsoft won't wait so long again to update the underlying OS in the next version of Pocket PC (2004, code-named Magneto).



FEATURES FOR DEVELOPERS

Microsoft .Net Compact Framework: The most important feature for developers is the inclusion of the .Net Compact Framework in ROM. The .Net Compact Framework allows developers to create Pocket PC applications using exactly the same tools and development environment that they use to create desktop applications. Specifically, that means Visual Basic .Net and Visual C# .Net (for managed code applications), using Visual Studio .Net and the Pocket PC 2003 Software Development Kit (SDK). Native code applications can still be developed using eMbedded Visual C++ 4.0. The ".Net" aspect simply means that developers can

incorporate native XML Web services in their applications easily and efficiently.

Windows CE 4.2: The use of Windows CE 4.2 as the underlying OS provides a very extensive set of capabilities upon which developers can draw. The relative maturity of CE 4.2 also adds stability and reliability to the development platform.

Improved Emulator: The Pocket PC 2003 SDK emulation environment is now a true virtual computer. It can emulate Pocket PC 2003, as well as Pocket PC Phone Edition 2003 with external or virtual radios. The Virtual Radio emulator lets developers send SMS messages that appear to come from an actual radio network.

Remote Configuration: Configuration of the Pocket PC 2003 Phone Edition can be handled over-the-air (OTA, wirelessly) via WAP push transmission mechanisms and security methods.



CONCLUSION

When you switch on a new Pocket PC and see "Windows Mobile 2003 for the Pocket PC" for the first time, everything will look very familiar. For example, you'll see the same Today screen (with a minor enhancement) and the same built-in applications. As you look a little closer, you'll discover the top three significant enhancements: (1) greatly improved support for wireless (Wi-Fi, Bluetooth and wide-area), (2) an up-to-date Pocket Internet Explorer that's compatible with IE 6.0 and a whole lot faster, and (3) improved multimedia support through Windows Media Player 9 Series. Other than that, there is a variety of little improvements here and there on the user level. Under the hood, things are very different – the underlying OS is now the latest version of Windows CE (4.2), which makes Pocket PC 2003 even better for enterprise applications. If your current Pocket PC can be upgraded to 2003, go for it – it's probably worth it for the improved performance, if nothing else. If your current Pocket PC can't be upgraded to 2003, there may not be enough new in 2003 to justify buying a new one unless one or more of the top three significant enhancements really hits your hot button.



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HP iPAQ h1935

HP iPAQ h1940/45

TWO NEW BARGAIN IPAQS

BY CONRAD H. BLICKENSTORFER

Some time ago a friend called and said she'd tried to buy one of those cute little HP iPAQ 1910 Pocket PCs but was told they were no longer available. She was relieved to hear that while the 1910 has indeed been discontinued, that's because Hewlett Packard replaced it with two new models, the h1935 and h1940. The h1910, for those new to the Pocket PC arena, was the enthusiastically received miniature iPAQ, a tiny, elegant minimalist PDAs that offered a lot for the money. In our March 2003 review we praised this little jewel for its size, price, and terrifically sharp and crisp display. However, we felt that Hewlett Packard perhaps made too many compromises in its effort to sell the h1910 for just US\$299. For example, the little iPAQ had no SDIO support, no Bluetooth, and had the slowest processor in the XScale PXA lineup. It came without a cradle and could not accommodate any expansion jackets. It also came with only the Professional and not the Premium version of Pocket PC 2002. And the use of cheap NAND flash meant that applications had to be copied into 16MB of segregated SDRAM memory to run, leaving users with just under 47MB of actual memory.

We're pleased to report that the two new models addressed some, though not all, of those shortcomings. Both newcomers retain the h1910's design, which means they still measure a minuscule 4.5 x 2.75 x 0.5 inches and weigh just 4.4 ounces. Both now have SDIO-capable SD card slots that can be used for more than just storage, and most notably for the new SD-based 802.11b adapters that are coming to market.

Of the two new models, the h1935 is the true successor of the original iPAQ h1910. It assumes the role of the lowest cost iPAQ you can buy. It comes with Windows Mobile 2003, the successor to the Pocket PC 2002 software platform. Most users won't notice the difference, but it is definitely a more stable platform built on the latest release of Windows CE, CE.NET 4.2. Unlike the h1910 which had a 200 MHz XScale processor, the h1935 has a 203MHz Samsung 2410 CPU. However, despite the improvements, the new model sells for less! The h1935 costs just US\$249, and at the time of this review, HP offered an additional US\$50 discount. So for US\$199 you get full Pocket PC functionality. No one can argue with that, even if the

h1935 has just an unusually stingy 90 day guarantee on parts and labor. Another thing that's still missing from the h1930 is non-volatile storage. Just like in the h1910 there is none. If you forget to back up your data and let the device run out of juice, it's bye-bye data.

The h1940, released a couple of months before the h1935, assumes the role of the high end model of the 1900 Series. Despite carrying the same US\$299 price (minus possibly a \$50 rebate from HP) as the original h1910, the h1940 is a much more useful device. It is quicker because it's based on a 266MHz Samsung 2410 as opposed to the 200MHz Intel PXA250 that powered the original model. That and the new Windows Mobile 2003 software result in benchmark numbers almost twice those of the h1910. It has built-in Bluetooth, something we strongly suggested in our review of the h1910. User-available memory is up to 57MB and—thank you, Hewlett Packard—there is up to 14MB of "iPAQ File Store," non-volatile memory for backing up data and programs. The latter is very much appreciated. You can, of course, do a backup on a SD card, but I

often move those around from device to device, and prefer having internal non-volatile storage. The h1935 doesn't have it, and that alone might be worth the extra money. Interestingly, the H1940 has the standard one-year warranty. One less thing to worry about.

One thing we noticed about the new 1900 Series iPAQs is that their 3.5-inch 240x320 pixel transfective TFT display, while very good by any standard, doesn't seem to be as brilliantly sharp and crisp as that of the original h1910. It also has an odd yellowish tint to it that becomes more noticeable when you view the display from an angle. Also, the backlight, while adequate, is nowhere near as strong as that of the 5000 Series iPAQs. Is this a problem? No. The LCD used in the 1930/1940 is very good and the backlight is bright enough. It's just not as good as the one in the h1910 which they replace. Like all other current iPAQs, the 1900 Series gets its DC power through the docking connector and does not have a separate power jack. Instead, its power cable has an adapter dongle attached to it. If you have the optional cradle you plug the standard power jack into it. If you don't have one, you need the adapter to charge the device. Not a very elegant solution.

As far as software goes, the 1900 Series comes with Windows Mobile 2003 for Pocket PC, Professional Edition. This is a very mature and complete software suite that addresses most users' needs. The Professional Edition doesn't include Microsoft Reader in ROM, something I'd miss, and there is no terminal services client, which is no big deal for most non-corporate users. The bundled CD includes some additional software and trials.

If you're in the market for a bargain Pocket PC, which of the two should you buy? The h1935 is a terrific value, especially with the HP rebate. But for just \$50 more you get built-in Bluetooth, a real warranty, and those invaluable 14 MB of non-volatile storage. In our book that makes the h1940 the device to buy. Realize, though, that most likely you'll have to spend a few dollars more as neither of the two comes with a cradle or a case. You may be able to live without a cradle (I hardly ever use them), but you definitely need a case to protect these relatively fragile little marvels from harm. www.hp.com

The two new HP iPAQ 1900 Series models offer excellent value in a small, light, elegant package.





HP iPAQ h4150

HP iPAQ h4350

HP IS ON A MAJOR ROLL: MORE NEW IPAQS!

BY CONRAD H. BLICKENSTORFER



No one can accuse Hewlett Packard of resting on its laurels as the world's Pocket PC top dog. During a difficult time in HP's corporate life where everyone was busy merging Compaq's very different culture into HP, whoever is responsible for the iPAQ brand did an extra-terrific job at it. Not only did the iPAQ part of the Compaq/HP transition go smooth as can be, but us lucky consumers are bombarded with one new iPAQ after another, each new one more spectacular than the last. So just as we were done marveling over the two significantly upgraded 1900 Series models, HP called with more news: "The 4000 Series is ready. Do you want to take an early peek?" Did we ever!

So the new iPAQ h4150 and h4350 arrived and had us drop everything else for a few days. At first sight they do not seem to belong to the same family. The h4150 looks like a high end 1900 Series model whereas the h4350, the first ever iPAQ with an integrated keyboard, seems a different device altogether. This is not like Handspring which once built the original Treo 180 both in a keyboard and a non-keyboard version. These two terrific new iPAQs are very different from one another and will appeal to different customers. They do, however, share a lot of technology, so let's start there:

Like most new Pocket PCs, the 4000 Series models are built around the 400MHz version of Intel's XScale PXA255 processor. Both have 64MB of SDRAM and 32MB of ROM. 128MB would have been nicer, but these are, after all, not HP's top of the line iPAQs. Anyway, of the 64MB, about 57MB is available to the user, and between three and seven is reserved for non-volatile internal backup. Both have impressive transfective TFT displays measuring 3.5 inches diagonal. Both have removable Li-Ion battery packs. Both have, YEAH!, built-in Bluetooth and built-in 802.11b wireless LAN. Both have "real" 3.5 mm earphone jacks, not those tiny 2.5 mm ones that require an adapter. Both come with a nicely designed new cradle and a basic protective canvas slip cover.

Now what sets them apart?

Let's take the more conventional 4150 first. Although it looks like a 1900 Series, it's really a different design. It is almost as thin and light as the h1930/40 but not quite. However, that less than half an ounce of extra weight was put to extremely good use. The 400 MHz PXA chip is clearly faster than the Samsung processor in the 1900 Series. And having built-in 802.11b wireless LAN is simply priceless as it leaves the SD Card slot available and you never have to hassle with settings or peripherals. With more and more places having wireless LAN and "hotspots," having wireless capability built right into the device is a tremendous convenience.

The display, I must admit, is a bit of a mixed blessing. Compared to the Sony LCD used in the 4350, it has a distinct and noticeable yellowish tint.

Bottomline, for US\$449 you get the fastest, best, and fullest equipped of HP's micro iPAQs. The \$150 price difference between it and the very nice h1945 is perhaps a bit much, but if you can afford it, there is nothing like the h4150 in this class.



So now let's look at the first iPAQ ever with an integrated keyboard. Unlike Palm, Sharp, and others who recently added "RIM-style" thumb-type keyboards to their PDAs, HP chose a fixed rather than a slide-out keyboard. That makes the unit feel more sturdy, but it does add a good inch in length to the 4350. The keyboard itself is 36%-scale and has matte-silver keys with black letters that have blue backlight so you can use the keyboard even in the dark. Each key has a shift or function secondary. Those do not light up and are thus more difficult to use in the dark. If you are into thumb-typing, this keyboard works well, though in my opinion, RIM's own keyboards remain the gold standard. There is no need to set the device to use the keyboard. It is always ready and available, even if you're in Transcriber, Block or Letter Recognizer mode. Very handy. That said, the extra length does require some getting used to.

The h4350's display is crisp and white, and definitely a notch better than that of the h4150. The device is quick, and having both Bluetooth and 802.11b means you can always get connected. And last but not least, HP took advantage of the h4350's extra real estate and gave it a much more powerful battery, 1560mAh instead of just 1,000mAh in the h4150. Big difference.

All that will set you back US\$499 list. Not bad for a Pocket PC this powerful and this versatile. And major kudos to HP! www.hp.com



HP iPAQ h5100

HP iPAQ h5500

THE PERFECT CORPORATE CITIZENS

BY CONRAD H. BLICKENSTORFER

I think it's safe to say that the original iPAQ almost singlehandedly saved the Pocket PC platform from oblivion three years ago. In those early days of new millennium, Palm ruled supreme while generation after generation of Windows CE-powered devices missed the mark. The iPAQ changed all that. It was a stunning, revolutionary product that quickly became the blueprint for an entire platform. The iPAQ pioneered the speedy 206 MHz StrongARM processor, modular expansion sleeves, internal Lithium Polymer power, and the first indoor/outdoor color display. Subsequent generations of iPAQs refined the concept to the two devices featured on this page, the HP iPAQ h5100 and h5500.

If you have one of the original Compaq iPAQs, you may look at these new models and think that nothing has changed at all. That's because the iPAQ product management team has done an admirable job in retaining the original look and feel while keeping the iPAQ at the forefront of Pocket PC technology. What has changed and what hasn't?

First what hasn't. The overall size and shape is still pretty much the same, although whereas 5.25 x 3.3 x 0.63 inches were considered almost impossible small when the original iPAQ launched, that same body is now considered a "full-size" PDA. Weight remains around seven ounces depending on the version. An investment in expansion packs is preserved as the latest iPAQs can still use all older sleeves. The 5000 Series iPAQs also retained the large (and increasingly rare) 3.8-inch display as well as the still novel Lithium Polymer battery technology of the original.

Once you place an old and a new iPAQ side by side and peruse their specs you quickly see that a lot has changed. The original had a large navigation disc that covered the speaker. The new models have a much smaller disc with the speaker on top and the microphone on the bottom (possibly for use as a cellphone; the 5000 Series has a SIM slot under its battery). While the internal Lithium Polymer battery of the original iPAQ had disappointing life and was not user-replaceable, the new models have a more powerful and replaceable 1250mAh power pack, and long-life 2,500mAh packs are available as an option. The highly praised



The latest in a long line of iPAQs, the 5000 Series represents performance, maturity, and excellent value.



reflective color display has long been replaced with a transfective screen. It is much better indoors, does away with the annoying sidelight, yet offers almost the same contrast outdoors. Despite the availability of various expansion sleeves, the original iPAQ was criticized for not having any internal expansion slots. The 5000 Series at least has a SDIO-capable slot on top of the device. The cradle looks almost the same as the original, but it is a different design and only fits the new models. That's because the 5000 Series gets its power through the main docking connector. There is no separate AC power jack, one of the few things I miss from the earlier models. A lot has changed under the hood as well. The once revolutionary 206MHz Intel StrongARM processor is long gone. It's been replaced by a 400MHz Intel XScale PXA255 chip that's speedier and more frugal at the same time. The software looks almost the same, but it's now Windows Mobile 2003 for Pocket PC, two revs and many enhancements ahead of the original Pocket PC software platform. And whereas a dead battery meant the loss of all data not backed up onto a storage card, the 5000 Series has internal non-volatile "File Store" memory.

What's the difference between the US\$549 h5100 and the top-of-the-line US\$649 h5500? Quite a bit, actually. The extra hundred dollars buys you twice the memory (128MB instead of 64MB), 17 instead of just 4MB of non-volatile backup storage, integrated 802.11b wireless LAN, and a biometric fingerprint reader for extra access security. While not everyone will have a use for the fingerprint reader, the extra memory and the internal wireless LAN make the h5500 an excellent value for the money. For that reason we awarded it the *2003 Pen Computing Magazine Editor's Choice Award* for best corporate Pocket PC.

In summary, the iPAQ 5000 Series, and especially the 5500 model, is as good as it currently gets in the Pocket PC arena. These are powerful, mature, reliable and well designed pocket computers that complement a desktop or notebook at a small fraction of the size. In addition, HP's leadership position and the longevity of this splendid platform have resulted in an unsurpassed wealth of add-ons and expansion sleeves of every kind.

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DAP Technologies MicroFlex CE8640

DAP'S NEW HANDHELD COMBINES
RUGGEDNESS, SIMPLICITY
AND PERFORMANCE.

BY CONRAD H. BLICKENSTORFER



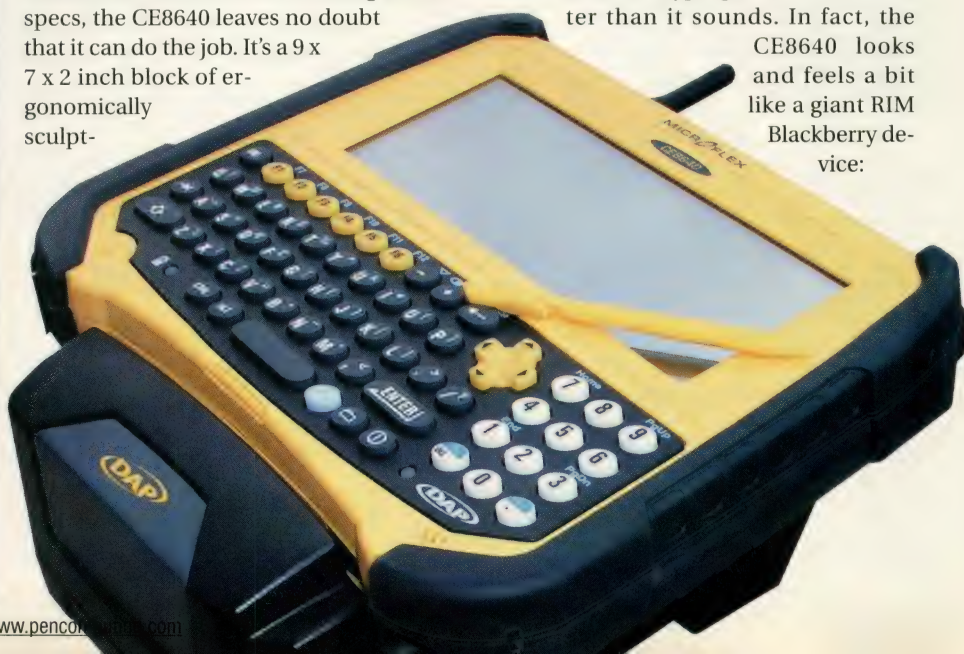
There are any number of flashlight-style vertical market handhelds, some industrial-strength PDAs, and a variety of Windows pen tablets, some of them running the new XP Tablet PC Edition. What's much harder to find is a serious mobile computer that's simple enough to be used anywhere by anyone. A computer that is small enough to fit almost anywhere yet big enough so that people can see what's on the screen and use it even if they wear gloves. A computer that is tough enough so that it won't break when it gets tossed around or falls off the truck or tumbles down a slope. Such a computer most likely shouldn't have a disk drives as even the best insulated and protected drives are still somewhat vulnerable. It also wouldn't run standard Windows with all its complexities and things that can go wrong. And it definitely needs more than the two or three hour battery life available from most notebook and slate computers. Finally, if the price is lower than that of a full-size Windows machine, that's okay, too.

I am holding one such machine in my hands. It is the Microflex CE8640 from DAP Technologies, a Canadian company that's been designing and building mobile computers for more than 20 years. DAP calls the Microflex line "all terrain computers designed for collecting data in the harshest conditions." Without even knowing its tech specs, the CE8640 leaves no doubt that it can do the job. It's a 9 x 7 x 2 inch block of ergonomically sculpt-

ed plastic that feels just about indestructible. Specs say you can drop it from four feet to concrete and that's probably an understatement. It also runs in temperatures between minus four and plus 122 degrees Fahrenheit and sports an IP67 rating, which is just about as good as it gets. Only IP68 would be better, meaning that you could leave the device under water forever, which few customers will likely want to do.

Technically speaking, the CE8640 is a Windows CE device running CE 3.0 on a 206MHz StrongARM processor. That is a good, solid combination as both CE 3.0 and the StrongARM are mature, reliable, and have widespread hardware and software support. DAP's engineers chose a 640 x 240 pixel "wide format" display that used to be found on Windows CE Handheld PCs. It seems to be a transfective design, bright and contrasty indoors, and quite readable in direct sunlight. There is a full keyboard with a separate keypad, function keys and all. The QWERTY layout is only 65% scale, so it's not for touch typing. It is, however, large enough to hunt and peck, or you can even do RIM-style thumbtyping where you hold the device in both hands and use your thumbs for typing. Works much better than it sounds. In fact, the

CE8640 looks and feels a bit like a giant RIM Blackberry device:



IN BRIEF

DAP Technologies' MicroFlex CE8640 is a handy, simple, powerful and very rugged computing and data collection device for harsh and harshest environments. Based on tried and true technology, the CE8640 packages widely supported Windows CE-standard hardware and software into a device that's eminently practical. The 640 x 240 pixel wide screen has more real estate than a handheld terminal or PDA. There is a full, albeit small, QWERTY keyboard, a full keypad, and all the necessary navigation and function keys. The CE8640 is completely radio-ready and can be equipped with a wide variety of RF options. Adding a laser scanner or RF-TAG reader can further expands functionality. This is a device for those who need a powerful handheld but not the complexity of full Windows.

DURABILITY

A nearly invulnerable device with a stellar IP67 rating. Everything seems very well designed and engineered. It doesn't look like this one will break or let you down.

COMPETITION

Similar "open book" designs from Itronix, LXE, Microslate. Also flashlight-style handhelds with keyboards.

CONTACT US

<http://www.daptech.com>

THE MICROFLEX CE8640'S CLEVER "OPEN BOOK" DESIGN ALLOWS FOR EASY DATA ENTRY AND A LARGE, READABLE DISPLAY

tough, functional, no nonsense. The keys are made of rubbery plastic. Black for the standard keys, white for the numeric keypad, and yellow for the function keys. All keys are labeled in large, very easy-to-read letters. And the keyboard is backlit.

In terms of ergonomics, the overall design is near perfect. The main body is designed sort of like a catamaran boat, with each "hull" neatly fitting into one hand. You can hold it with your left, your right, or both. There's an elastic handstrap that you can use on either side. Each side of the 8640 is protected by a thick, black, integrated rubber molding that makes it even easier to hold, and it provides extra protection. One of the hulls contains the battery, a big 2,000mAh, 7.4 Volt—or 15watt-hour—Lithium-Ion pack that's held in place with an integrated screw that you operate via a thumbwheel. There is no way that it will pop open unless you want it to. And DAP says the battery will last through a full shift. Mounted between the two hulls in the back of the unit is an expansion bay that's securely sealed and held in place by four screws. It houses and protects two Type II PC Card adapters. In our review unit, one slot was occupied by a Sierra Wireless AirCard 750. The other one was available for extra expansion. A sturdy rubber-covered two-inch antenna stub screws on for optimal radio performance.

You wouldn't expect too many leakage-prone openings and connectors on a unit carrying an IP67 rating, and there aren't many. Just a completely sealed RJ-45 LAN jack, the aforementioned antenna connector, and an IrDA window you can use to synchronize or communicate with another computer. You can also get optional integrated laser bar code scanners and RF-TAG readers.

In terms of storage, the CE8640 offers considerable flexibility. It comes with 64MB of RAM plus two 16MB NAND Flash storage units. That's plenty of space for both applications and data.

Those who haven't checked the Control Panel of a Microsoft-powered Handheld PC since those funky little clamshells Microsoft tried to promote in the mid and late 1990s are in for a surprise. This is embedded Windows 3.0 (with CE.Net available by September). We're taking real power and functionality here. There are no fewer than 22 panels, including the ones for the FTP Server, network, color scheme, power supervisor, serial port settings, hardware browser, and more. DAP's own DUB utility allows backups and restores, cloning, easy OS upgrades, and automatic file transfers.

Since devices like the CE8640 will be used in many different environments and for many different jobs, DAP offers two kinds of docks. Both are of the quick-release charging type. One offers up to four serial ports at the bottom. Since many field peripherals still use serial connections, this dock will accommodate them all. The other dock has an Ethernet jack for high speed network connectivity and one serial port. If you need USB, DAP can provide that as well. Both cradles are as tough and all-business as the MicroFlex CE8640 itself.



DAP MICROFLEX CE 8640 SPECIFICATIONS

COMPANY	DAP Technologies
PRODUCT	MicroFlex CE8640
PROCESSOR	206MHz Intel StrongARM SA-1110
OPERATING SYSTEM	Windows CE 3.0/CE .NET
COMMUNICATIONS	RJ45, IrDA, wireless options
MEMORY CONFIGURATION	32-64MB SDRAM and 32-128MB non-volatile Flash
DRIVES	NA
SLOTS	2 internal, sealed PC Card Type II
DISPLAY	6.5-inch 640 x 240 monochrome or transfective color
KEYBOARD	64-key 65%-scale with keypad
PEN/DIGITIZER	Touch screen
DIMENSIONS	9.1 x 7.3 x 2.0 inches
WEIGHT	2.45 pounds including battery
HOUSING	Plastic
OPERATING TEMPERATURE	-4 to 122 degree Fahrenheit
ENVIRONMENTAL RESISTANCE	NEMA IP67; 4-foot drop
POWER	Replaceable 15 Watt-Hour Li-Ion battery pack (8-10 hours)
INTERFACE	RJ45, IrDA, audio in/out, speaker, mic., opt: USB, RS-232, DB-9, V.92
OPTIONS	Cradles, backlit keyboard, laser scanner, RF-TAG reader, wireless
PRICE	Inquire (depends on configuration)
CONTACT	www.daptech.com

The CA8640 has a touch screen but you can also operate it via a navigation pad on the keyboard. There are no overlapping windows in CE 3.0, and what applications you find on a 8640 depends on your particular needs and configuration. Ours had Internet Explorer on it, but none of the Office Pocket applications.

Many of the devices controls are operated via the keyboard. Backlight brightness, for example, can be adjusted in 24 steps. You can turn the backlight on and off. There is a total of 12 function keys, programmable, of course.

Like most vertical market computing devices, the CE8640 is highly configurable and customizable. The internal expansion bay allows for just about any radio, and DAP will happily assist in creating just the right solution. If you need a handy, simple, tough handheld without the complexity of a full Windows notebook or slate, give DAP Technologies a holler. In the MicroFlex CE8640 they have a perfect device for almost any tough job out there. 



Tripod Data Systems Recon 400

THEY DON'T COME ANY
TOUGHER THAN THIS

BY CONRAD H. BLICKENSTORFER



IN BRIEF

Tripod Data Systems' Recon is a heavily sealed and ruggedized mobile computer based on Windows Mobile 2003 for Pocket PC and a high-speed Intel XScale processor. The device was primarily designed for use in surveying situations, and TDS offers the Recon bundled with its Survey Pro and SOLO software. However, the intelligently designed Recon could be used in many other areas that require state-of-the-art mobile computing power and utmost ruggedness. An easily replaceable "PowerBoot" module includes full-size USB and serial ports as well as a large NiMH battery, providing the Recon with excellent flexibility. The reflective screen has a bright LED frontlight that allows indoor/outdoor readability even in extremest temperatures (-22 to 140 degree Fahrenheit).

DURABILITY

An extremely tough device with a superb IP67 rating, the Recon is very well designed and engineered. It is unlikely to break or let you down.

COMPETITION

Rugged Pocket PC and handheld designs from Casio, Intermec, Panasonic, Psion Teklogix, and Symbol.

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<http://www.tdsway.com/handhelds>

Pocket PCs are coming on strong in corporate and vertical markets as evidenced by a variety of new and exciting Pocket PC-style products built for very specific purposes. The TDS Recon is one such product.

Who is TDS? It's Tripod Data Systems, a highly regarded hardware and software developer for mobile computing applications located in Corvallis, Oregon, and a wholly owned subsidiary of GPS-specialist Trimble. TDS has been around for over 15 years and industry insiders may know the company as At Work Computers, a division of TDS whose name used to be on the company's line of Ranger ruggedized mobile computers. These days all hardware products carry the TDS brand name, including the Recon featured in this review. The Recon was introduced in February of 2003 as a cost-efficient hardware/software surveying bundle and also as a Windows CE-based alternative to running TDS surveying software on third party platforms such as the Hewlett Packard 48GX handheld computer. The 48GX is a great machine, but it's really more a programmable calculator than a computer, and not a very rugged one at that.

The Recon, on the other hand, looks like a heavily ruggedized Pocket PC and in many respects that is exactly what it is. It even uses standard Windows Mobile 2003 for Pocket PC software. Based on state-of-the-art hardware, the handsomely styled Recon offers traditional TDS clients a far more powerful and flexible alternative, and TDS itself an addition to its mobile computer lineup that may well open entirely new markets for the company.

It is immediately obvious that a lot of thought went into the design of this machine. This is not just a PDA in a protective case. Instead, it's a powerful mobile computer designed from the ground up to be a flexible tool for tough jobs. Designing such devices is never easy. How can it be both functional and expandable *and* tightly sealed? Tripod came up with a great solution, a "PowerBoot" module that integrates the battery and ports into one easily replaceable component. That way

the electronics inside can be much more easily sealed and protected. On top of the Recon, a sealed rubber cap covers two CompactFlash card slots that can be used with a variety of GPS, Bluetooth or wireless radio options. It is held in place with two screws and provides a completely watertight seal. As a new design, the Recon isn't burdened with a poky legacy processor. Instead, it comes with either a 200 or a 400 MHz version of Intel's

XScale PXA CPU, 64MB of RAM and 64 or 128MB of non-volatile internal Flash



THE HEAVILY RUGGEDIZED TDS RECON OFFERS STATE-OF-THE-ART PERFORMANCE IN AN ULTRA-TOUGH PACKAGE

memory, depending on which version of the Recon you buy. The display is a 3.5-inch front-lit reflective TFT. Why not a transreflective LCD like most leading Pocket PCs? After all, transreflective displays offer the best compromise between indoor and outdoor readability. Well, TDS chose reflective because the Recon is likely going to be used outdoors most of the time, and reflective technology still offers by far the best and sharpest outdoor viewing.

With regard to its visual resemblance to a familiar Pocket PC or other consumer handheld, yes, it does use that familiar form factor, but the Recon is larger and heavier than any of those sleek little Palms or iPAQs. That's because Tripod built it to withstand multiple drops from four feet, operate at temperatures from icy-cold minus-22 degrees all the way up to 140 degrees Fahrenheit, while also being almost completely protected from just about anything that man or mother nature can throw at it. TDS says that test Recon kept working even after 38 4-foot drops onto concrete. Likewise, they subjected one to seven days in a 158 degree oven and submersion into water for an hour, and it kept on working. All of that earns the Recon a stellar IP67 rating. There's very little hardware out there that can match that, or even come close, and that's good news for the Recon's target markets. Those folks work outdoors, and often in the harshest possible conditions.

Yet, despite its impressive ruggedness and heavy duty construction, the Recon measures just 3.75 x 6.5 x 1.75 inches and weighs just over a pound. That's actually smaller and lighter than any of the original PDAs of the early and mid-1990s, including the Apple Newton MessagePad.

Given its advanced technologically underpinnings, impressive environmental specifications, the US\$1,499 starting price for the 200 MHz Recon 200 is a bargain. The faster Recon 400, which also has twice the internal Flash memory (128MB), starts at US\$1,799. TDS also sells the Recon with surveying software bundles. These include various versions of the company's Survey Standard/Pro or SOLO Field software.

How does the Recon feel and handle? It is definitely a tool for tough job. The housing is bright yellow plastic and black rubber, making it hard to lose sight of the Recon. For those who deem it a tad too bright, TDS offers a gray plastic housing instead. As for operation, there are none of those flimsy Pocket PC-style rocker switches or side-mounted push buttons. Instead, the Recon's controls are all located in the front, below the display. There is a four-way navigation disc, enter and escape buttons, Alt and Home buttons, and an on-off button. All sit under a molded rubber sheet and are completely sealed.

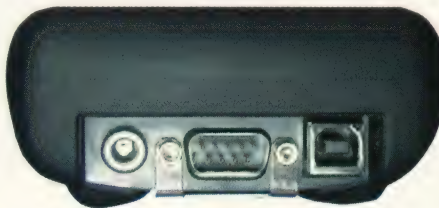
The before-mentioned PowerBoot contains a variety of interfaces. Ours came with a standard



TDS RECON 400 SPECIFICATIONS

COMPANY	Tripod Data Systems
PRODUCT	Recon 400 (also branded as Trimble LM80 and In-Situ RuggedReader)
PROCESSOR	400MHz Intel XScale PXA255
OPERATING SYSTEM	Windows Mobile 2003
COMMUNICATIONS	Bluetooth and wireless CompactFlash options
MEMORY CONFIGURATION	64MB high-speed SDRAM
DRIVES	64 or 128MB built-in Flash
SLOTS	2 internal, sealed CF Card (1 Type I and 1 Type II)
DISPLAY	3.5-inch 240 x 320 LED-frontlit reflective color LCD
KEYBOARD	Onscreen
PEN/DIGITIZER	Touch screen
DIMENSIONS	3.75 x 6.5 x 1.75 inches
WEIGHT	1.1 pounds including battery
HOUSING	Plastic/rubber
OPERATING TEMPERATURE	-22 to 140 degree Fahrenheit
ENVIRONMENTAL RESISTANCE	NEMA IP67; multiple 4-foot drops
POWER	Replaceable 3,800 mAh NiMH battery pack (15 hours typical)
INTERFACE	USB, RS-232, power, speaker
OPTIONS	Software bundles, straps, mounting brackets, Bluetooth, cases, cables
PRICE	Starting at US\$1,499
CONTACT	www.tdsway.com

9-pin serial port and a standard 4-pin USB jack in addition to the power jack. No need for a proprietary cable or cradle here. The PowerBoot also contains the 3,800 mAh NiMH battery, which TDS claims is good for up to 15 hours of typical operation between charges.



Our review unit actually came with CE .Net instead of Windows Mobile 2003 for Pocket PC—a configuration that TDS initially considered. That software environment looked more like that of earlier keyboard-based Handheld PCs, with a Windows-style Start menu at the bottom and Windows-style walking menus. Though different from Pocket PC, the CE .Net software was by no means lacking. In addition to Internet Explorer, Media Player, the Inbox and other Pocket PC stal-

warts, there were Microsoft file viewers for all major Office applications, Microsoft WordPad, Remote Display Control, Transcriber, a DOS command prompt, many control panels, and optional TDS-specified surveying applications.

Just because the Recon is a vertical market tool doesn't mean it can't do multimedia like a consumer Pocket PC. Ours came with several high quality video/audio clips highlighting the Recon's toughness. And there is no limit to adding third party or custom-designed software applications. Among accessories and options offered by TDS, there are mounting brackets, hand and neck straps, carry cases, cables, and cards.

Who should look at the TDS Recon? Obviously those already running TDS surveying software on older hardware, but the Recon's appeal really goes well beyond that circle. While there are other ruggedized Pocket PC and embedded CE.Net devices, the Recon is likely the hardest and toughest of them all. So if you need substantial computing power in a compact package that can take a lot of abuse, the Recon from Tripod Data Systems is a prime candidate. 

Samsung SPH-i700

Windows Powered Pocket PC

THE IDEAL COMMUNICATOR?

BY DAVID MACNEILL

When I try to describe the target market of Pocket PC Phone Edition devices, an old TV ad slogan often comes to mind: "It's not for everyone — then again, it doesn't try to be."

These admittedly somewhat bulky machines are designed to appeal to handheld power users who do not want to carry a separate mobile phone around. Those individuals are simultaneously minimalists and maximalists, for want of a better term. They crave a single, all-powerful device to handle their digital life-stream when they're away from their personal computer. Cost is irrelevant — they're on a mission to pack as much digital firepower as possible in as small a space as is practical.

Early Pocket PC phones, like the Audiovox Thera/Toshiba 2032 and the much better HTC-made T-Mobile Communicator/Siemens SX-56/02 XDA device, were just barely adequate as handhelds. They had low-bit displays, last year's processors, and a wimpy 32MB of memory. But we bought them anyway as they were our only choice — and the phone side worked quite well, thank you very much.

Synergize me, baby!

I carried the T-Mobile Pocket PC phone device faithfully for almost a year, during which time it elicited reactions ranging from, "That's SO COOL!" to "That is the biggest cell phone I've ever seen." It's easy to describe what a communicator is composed of, but much harder to explain the synergistic effect of weaving your most personal data with wireless Internet connectivity and voice communications. It's almost easier to list the things this machine cannot do, as it's the shorter list of the two.

But technology, being the implacable force of change that it is, quickly made my little communicator feel inadequate. One look at those swanky new HP iPAQ 5500s and I knew I had to find a replacement for my trustworthy but slightly boring companion. There had to be a better communicator somewhere out there.

Three time zones later...

It was about this time that I moved to Norwalk, Connecticut, 40 miles northeast of New York City. Good old AT&T Wireless is just a bit player here, so after ten years with the same mobile number I switched to Verizon, the market leader in this part of the country. I entered the store and — lo! — what have we here? The brand-new Samsung SPH-



i700 Pocket PC phone, the very same my editor-in-chief at the *Pen Computing* editorial office in California had unsuccessfully been trying to get his hands on for months. Ultra-bright 16-bit TFT display, 300Mhz XScale CPU, 64MB of memory, removable batteries, and even a 640 x 480-pixel digicam — all packaged up in a sleek silver metal package worthy of the best iPAQs. It's so new they don't even sell them in the store; you have to order them from a fulfillment center. As it turns out, what they are shipping is, indeed, fulfilling.

US\$600 and a US\$145 dollar per month 1000 minute voice/unlimited data plan later, I'm walking on the beach, reading and replying to my POP3, IMAP4, and Exchange email across Verizon's 1XRTT Express Network, running at roughly twice the speed of a terrestrial modem. I can live with this! And just to make life sweeter, the i700's voice quality over the Verizon network is the best I've ever heard, bar none. CDMA/1XRT blows the doors off GSM/GPRS.

Clearly, the i700 boasts some fine components, but parts is parts; without intelligent software to make it all sing in tune, it's just a pricey paperweight. Samsung has done a fine job in this regard, with very solid software for their camera module as well as a better-than-average collection of control panels to customize the overall user experience.

Camera software just clicks

The Camera applet offers a clean, appealing interface and a shutter button you can't miss. Changing settings is easy: just tap on the resolution, exposure, and quality settings listed to the left of the shutter release and your options cycle with each tap. In the Settings menu you'll find another option, called AS for Adaptive Sensitivity. With AS enabled, the camera will capture two images — one long, one brief — then combine them into a single composite with a much wider dynamic range than a single shot can capture.

Another welcome feature is the Camera application's ability to be used as a display album for other JPG files you may have lying around, obviating the need for a separate image viewer. It lacks the feature set of a truly great viewer like SplashPhoto, for example, but it gets the job done and costs nothing. See a photo you want to share? Select it and email it off with a few clicks. It couldn't be easier.

See the corporate guy smile

In my new position here in New England, my colleagues and I rely on a Microsoft Exchange server for email, meeting arrangements, and the usual personal information management using Outlook — both Windows and Mac versions. Say what you will about some of Microsoft's other products; the Exchange/Outlook system is incredibly good software. It's the center for our whole



Far left: The Samsung i700 (right) and its closest competitor, the Hitachi G1000 (left). Both use state-of-the-art technology, both have fast processors, fairly high speed data communication, and an integrated camera. The Samsung is significantly more compact and also lighter than the Hitachi, though still massive by cellphone standards. The Hitachi has a faster processor and adds a remarkably good RIM-style touchtype keyboard for those who hate pop-up keyboards or handwriting recognition, but the thing is a brick. Still, both represent far and away the best merging of data communication, phone, and Pocket PC functionality yet.

SAMSUNG i700 SPECIFICATIONS

COMPANY	Samsung
PRODUCT	SPH i700 Pocket PC Phone
PROCESSOR	300Mhz Intel XScale PXA255
OPERATING SYSTEM	Windows Pocket PC 2002 Phone Edition
COMMUNICATIONS	CDMA Verizon phone, Verizon 1xRTT wireless data, USB via cradle or cable
MEMORY CONFIGURATION	64MB RAM, 64MB FLASH ROM
SLOTS	1 SD/MMC Card (no SDIO interface)
DISPLAY	3.5-inch 240 x 320 transreflective TFT LCD, 65,536 colors
DISPLAY LID	None (comes with protective case)
DIMENSIONS	5.2 x 2.8 x 0.6 inches
WEIGHT	6.9 ounces (including battery)
CONTROLS	Scroll wheel, application keys, stylus
POWER	Replaceable 1100 and 2000 mAh Li-Ion battery packs
BACKUP POWER	Lithium-Ion
INTERFACE	Cradle, power jack, IR, 2.5mm microphone jack
CRADLE	Included, USB connection, power jack
ONBOARD EXTRA SOFTWARE	Phone interface, camera application
OPTIONS	Hands-free mic, batteries, service plans
PRICE	US\$649 plus Verizon service
CONTACT	samsungusa.com, verizonwireless.com

corporation. As such, my Pocket PC syncs not just with a desktop PC but with the central nervous system of my company.

Verizon includes with the i700 an installer for Wireless Sync, an enterprise-grade application that securely connects your i700 to ActiveSync on your desktop compute. The idea is that you leave your corporate (or home office) PC on and connected to the Internet, with ActiveSync and Wireless Sync running in the background. Using the client applet the installer places on your i700, you initiate an ActiveSync from a Today screen bar or schedule one to occur at regular intervals. Provided you are within range of Verizon's Express Network, wireless ActiveSync begins — although at a somewhat lower speed than a direct USB connection. My syncs usually take from two to four minutes, including my corporate email, calendar, contact, task, and notes data. (I tried including my AvantGo channels but disabled it due to the extra few minutes each sync was taking.)

The whole operation works remarkably well, enabling me to cruise around, in or out of the office,

carrying just my communicator to stay in complete touch without a big notebook and lots of gizmos and wires. For corporate guys like me who work in a 100% Microsoft shop, Wireless Sync is a dream come true.

Samsung included a speed throttle control in Settings that allows you to jack up the default 200Mhz speed setting to 300Mhz for media playback, or power down to a measly 100Mhz if you need to squeeze every drop of juice out of your battery. Preferring to have the extra snap at all times, I have to go to the control panel and click 300Mhz after every reset. The only downside to "Turbo" mode is that my battery charges don't last quite as long, but since I place the i700 into its cradle for recharging every night and usually use the thicker of the two battery packs that come with the i700, I never worry about power.

There are faster Pocket PCs out there, and there are smaller phones, of course. But for a minimalist/maximalist like me, the Samsung i700 is closer to the ideal communicator than any other device you can buy. ☞

Hitachi G1000

PCS Vision Picture Phone

ELECTRONIC SWISS ARMY KNIFE

BY CONRAD H. BLICKENSTORFER

It's been a year since we reviewed the T-Mobile Pocket PC phone. At the time we expected competition to pop up all over the place, but that didn't happen and the sleek HTC-made device, under a variety of different names, had the market all to itself. This has come to an end with the emergence of the Samsung i700 and the Hitachi G1000, two second generation Pocket PC phones. What has changed? And what hasn't?

Unlike the T-Mobile, the interesting looking Hitachi has a 400 MHz Intel PXA255 XScale processor. It also has a very good transreflective LCD that can display 256k colors. It has onboard power and USB jacks so that you don't have to rely on the cradle or an easy-to-lose adapter. It has a built-in camera that takes 640 x 480 pictures which you can email directly from the phone or even place on a special web page via Sprint PCS Vision. It has a thumb-type keyboard and a SD card slot. And there's also an embedded E911 emergency location capable GPS module.

However, the G1000 has only 32MB of RAM—not much compared to the 64 and 128MB of most standard Pocket PCs. There is no non-volatile internal storage. The Hitachi is also quite large (5-5/8 x 3-1/4 x 3/4 inches and the antenna nub sticks out almost another inch) and weighs a full 8.3 ounces. Yet, despite its size, the G1000 has a small 3.5-inch display and not the larger 3.8 inch screen used in the 5000 Series iPAQs.

On the software side, while standard Pocket PCs now come with Windows Mobile 2003, the Phone Edition is still using the older Pocket PC 2002 platform that is based on Windows CE 3.1 and not CE .Net 4.2 with its superior reliability, better security, and full compatibility with the XScale processor architecture. Microsoft says this will soon change, but no dates yet.

The impressive G1000 has enough tricks up its sleeve to warrant a detailed perusal of the manual. As is often the case these days, the full manual is only available online. In this case it is definitely worthwhile as the 264-page pdf guide on Sprint's sprintpcs.com website is much more useful than the small bundled manual.

Compared to a plain vanilla Pocket PC, the G1000 has a lot of extras, and extra controls. On the lower left side, for example, are two switches. A "Key Guard" turns off the keyboard so that you don't inadvertently push keys when you don't want to, and an "Environment Switch" can be set to either issue programmed alerts in "Meeting," "Outdoor," "Office," and "Private" modes or si-



lence the device completely. You can set the phone so that it vibrates in meetings and rings extra loud outdoors. It's often difficult to remember how to turn off the ringer on a cellphone, and this switch does it elegantly while also allowing you to set the phone to different alerts in different modes. On the right side is a audio volume rocker, just like on many cellphones.

The VGA digital camera is built into the upper left of the device. It rotates 180 degrees, from full forward to full backward, and it's a bit too easy to end up with fingerprint smudges on the lens.

Just like a regular phone, the Hitachi has a green talk button and a red end button. A center button toggles between standard phone and speaker phone/voice dialing. There is also a "voice" button on the left side that activates a voice dialing system when pushed and the voice recorder when pushed and held down.

I remember when RIM pioneered "thumb-type" keyboards and everyone laughed at them. Not any more. Thumb-typing turned out to be surprisingly useful and more and more devices have a built-in or snap-on thumb-type keyboard. No one has ever matched the ergonomics of the original RIM keyboards, but the G1000 comes close. It's using pretty much the same layout as the RIMs, though the key rows are curved away from the user and not toward you as on a RIM. I prefer the RIM's combination of thumbwheel and function keys to the Hitachi's tiny cursor control keys, and I miss pressing and holding a key to capitalize

a letter. The keyboard also has eight programmable function keys and brightness control.

For power, the Hitachi has a replaceable main Li-Ion battery pack and a built-in backup battery. The main battery offers about 2.5 hours of talk time, seven days of continuous standby, or 12 hours of continuous PDA operation. Data is kept alive via the backup battery for about five days after the main battery is dead, then all data is lost unless it has been saved onto a card or PC. That's because the G1000 does not have internal, non-volatile backup storage. To make it worse, there is no automatic scheduling of backups.

A soft reset can be done by poking into a small hole in the back of the device. For a complete re-initialization, there is a nicely protected little switch inside the battery department. A good solution.

The G1000 comes with a USB cradle, but you can also connect the device directly via optional Mini-B cable. The IR port is on top, and a SD card slot on the left of the device. The headset connector is a small 2.5 mm jack, which is generally what phones use. PDAs, on the other hand, usually have 3.5 mm jacks, and so the Hitachi comes with a stereo mini plug adapter. Personally, I hate adapters because I will immediately lose them.

The Today screen is somewhat modified compared to the standard Pocket PC screen. There's a row with icons switch to phone mode, check battery power, and turn on or off location mode

which tells the service where you are, something that comes in handy with location-based applications (none of which really exist as of now).



Even turning the GPS off will still reveal location during 911 calls. An extra symbol shows up when you're roaming. There are also two rows of short-cut buttons: Call log, speed dial, voice mail, pictures, tools, and running applications. The Phone Edition has additional icons along the top Start bar. A small Martini-glass looking icon shows signal presence and strength. Other icons indicate email status, sound options status, missed calls and so on. Most are self-explanatory.

Phone operation itself hasn't changed since we reviewed the initial T-Mobile Pocket PC phone a year ago. There is an onscreen dialpad, talk and end buttons, access to speed dial and call log, plus easy access to the contacts list and the note taker (yes, you can take notes during a speaker/headphone talk). As is usually the case with phones, pressing key combinations in different modes will do different things, like erasing all log entries, silence the ringer, etc. Since the phone part of the Hitachi is not always needed and since it consumes power, you can turn the PDA part of the Hitachi on, but leave the phone turned off. Incoming calls will display the name of the caller as long as same is in the contacts list. A phone options tab provides access to a lot of phone and network information, you can customize the above mentioned environment settings, and even enable TTY mode, a system for the hearing impaired.

The Hitachi is a single band phone that gets service via the Sprint Nationwide PCS Network. It allows roaming on other digital networks. Since roaming can result in extra charges, you can turn on Call Guard that lets you know when charges apply. The service has the usual goodies: voice mail, Caller ID, call waiting, three way calling, and call forwarding. There is no switching to analog.

Voice Command is an extra cost option that uses voice recognition to locate names and associated phone numbers in your Contacts list. You say the name, wait to see what the system brings up, and then either say "Yes" or "No." A utility lets you customize voice recognition settings. There are two kinds of voice command. One that uses the internal contacts list and one that lets you record voice commands via the Sprint system.

Using wireless data communication is transparent. Whenever you want to check or send email, browse the web, or use instant messaging, simply start the application and the Hitachi will connect. Sprint's 1xRTT data network is a good deal faster than CDPD, but it is still no speed demon, and in many respect, a more complex online world has negated whatever speed increases new technology brings. Whereas I used to download 10 to 20 legitimate emails via CDPD, the faster G1000 had to wade through tons of spam. You can browse the web, but transmission speed and the small screen quickly teach you to find and bookmark some good text-only sites, such as the Voice of America, or BBC News.



Far left: The Hitachi G1000 comes with a standard USB cradle. Power jack can go into cradle or directly into the device which also has a separate mini-USB port. **Left:** The G1000's thumb-type keyboard looks like it's a snap-on unit but it is actually part of the main body of the device. Keys are fairly large and there are eight programmable functions keys. Yes, you can type on this.

HITACHI G1000 SPECIFICATIONS

COMPANY	Hitachi
PRODUCT	G10000 Pocket PC Phone
PROCESSOR	400MHz Intel XScale PXA255
OPERATING SYSTEM	Windows Pocket PC 2002 Phone Edition
COMMUNICATIONS	CDMA Sprint phone, Sprint 1xRTT wireless data, USB via cradle or cable
MEMORY CONFIGURATION	32MB RAM, 32MB FLASH EEPROM
SLOTS	1 Secure Digital Card (no SDIO interface)
DISPLAY	3.5-inch 240 x 320 transreflective TFT LCD, 65,536 colors
DISPLAY LID	None (comes with protective case)
DIMENSIONS	5.65 x 3.25 x 0.75 inches
WEIGHT	8.3 ounces (including battery)
CONTROLS	Scroll wheel, full thumb-type keyboard, stylus
POWER	Replaceable 5.6 Watt-Hr Lithium-Ion battery pack ("PDA up to 12 hours")
BACKUP POWER	Rechargeable Lithium-Ion
INTERFACE	Cradle, power jack, USB, IR, 2.5mm microphone jack
CRADLE	Included, USB connection, power jack
ONBOARD EXTRA SOFTWARE	Phone interface, camera application, ClearVue suite
OPTIONS	SD cards, batteries, service plans
PRICE	US\$649 plus Sprint PCS service
CONTACT	sprintpcs.com

The G1000 does not only have a digital camera, it also has good software to peruse and organize pictures, upload them onto a special Sprint webpage, and share them with friends. You take a picture, upload it, and place it into one of the folders you created in your Sprint picture repository. You can then select images to share with friends. To do so, you can use either your local contacts or the online Sprint address book. If you use local contacts, just click on the emails of the people you want the picture sent to. You can add commentary to the picture and even record a voice message. Recipients receive an email with a scaled image, your note, and selections to view the full size image or listen to the voice message. Clicking on either opens the browser and goes to pictures.sprintpcs.com. There you can view the full size picture, download it, read comments by others, and add your own. Each new comment can trigger an SMS message alerting you. The technology behind all this is by LightSurf, a company founded by none other than Philippe Kahn who once founded Borland.

The first time I used the picture upload feature I was thrilled by how quickly it moved just to find out that the upload wasn't done when the bar reach full. It just started over and over, meaning it's really an hourglass and not a progress bar. I'd rather know where I really stand.

In Camera mode you can set resolution to 640x480, 320x240 and 160x120. The two lower resolution allow digital 2X or 4X zooms. There are two levels of compression and five different white balances. The Review/Share function lets you view pictures taken by the camera or downloaded into the camera (as long as they are not too big). You can annotate pictures, attach them to contacts, beam them, and perform simple editing functions.

Service plans depend on where you live. In order to take advantage of all of the G1000's capabilities you need to sign up for a calling plan with Sprint's "always on mobile multimedia capabilities" PCS Vision that allows secure wireless access to Outlook and Lotus Notes, web access, messaging, and Picture Mail.

A week with the Hitachi brought back the questions the PDA industry has been grappling with for a decade. Do phones need PDA functionality? Do PDAs need a phone? If so, should the ideal convergence device be more like a phone or more like a PDA? Does it make sense to build a digital camera into a PDA or a phone? What compromise is acceptable or desirable? With the G1000 Hitachi went for broke and combined everything into one device. They did a fine job even though this PDA-phone-camera-communicator came out a bit large. If you like the electronic equivalent of a Swiss army knife, this is it. *LB*

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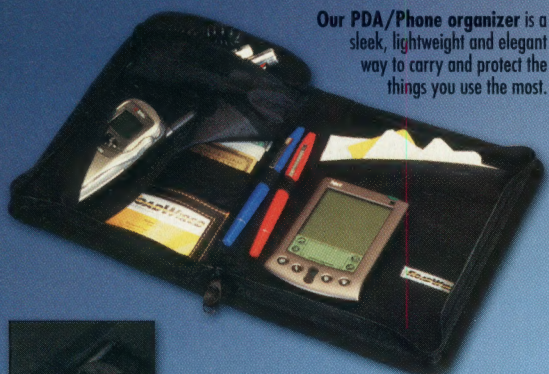
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DAVID MACNEILL

PHOTO BY THEANO NIKITAS

The writing has been on the wall for years now: the personal digital assistant, as we have known and loved it, is on life support and will soon be dead. Within two years, I predict the classic, unconnected PDA will be a child's plaything, nothing more.

According to Kevin Burden, analyst with IDC, "Growth and unit volumes [of unconnected PDAs] have reached their ceiling." His report indicates that the market for "converged" devices (communicators and smartphones) will see its strongest growth on 2003, with 13 million devices. Even better, volume is expected to grow 87% through 2007.

The report, *Worldwide Smart Handheld Devices Forecast and Analysis, 2003-2007*, states that, "From mobile phones to converged mobile devices, which combine the data capabilities of PDAs with the voice communication capabilities of mobile phones, competing device types will draw buyers away from traditional handheld devices."

Why the sudden acceptance of converged devices? Improved user interfaces, faster connection speeds, and lower prices. This year's crop of machines offer far more in terms of performance and features, all slipped into ever-slimmer packages. Upgraded GSM/GPRS and CDMA/1XRTT wireless data networks can now deliver IP packets at roughly double landline modem speeds for a much better user experience, and plan pricing is finally approaching a reasonable sub-US\$50 per month for unlimited usage. The cost of converged devices now average just below US\$500, down from close to US\$600 last year. That's still too high for mass adoption, but the trend is definitely headed south.

A giant leap backward

As a longtime devotee of handheld computers, it's been amusing to watch Nokia,

PDA: RIP

Ericsson, and the other mobile phone makers clumsily try to incorporate PDA-like functions into their handsets. Their results have been, on the whole, dismal, with cutesy, unusable user interfaces and tortuous data entry methods involving the maniacal thumbing of numeric keys — all murkily presented on dinky displays that make you scroll fifty times just to read a simple e-mail. And don't even get me started on those pathetic WAP and CHTML browsers. Sad, sad, sad. Even geeks don't use them.

So all these millions of potential PDA buyers get these cheap-or-free phones, discover that they can do rudimentary personal information management duties, then decide that a PDA is a useless extravagance. They thumb away and think they are hip, but they have missed out on close to two decades of technological evolution in the handheld computing space. Most have no idea what a good PDA can do for them, but you can't really blame the user for not wanting to carry around two devices when one will (sort of) do.

"Adequacy is sufficient," said the late portable PC pioneer Adam Osborne, and truer words were never spoken regarding the sale of mass technology. Most people seem to care less about the quality of their experience than the upfront cost of the machine. Apple owners know better, as do Sony CLIE, Palm Tungsten-T, HP iPAQ, and Samsung i700 owners, but they are in the minority and probably always will be.

2005

With the trend moving inexorably towards the phone/organizer, what will 2005's devices offer that today's don't? Very little in the way of new functionality is likely to emerge. The devices will become flatter and lighter and virtually all will have color displays, a large percentage of them using energy-efficient OLED technology. All but the most elaborate machines will cost under US\$300. Bluetooth will be ubiquitous and wireless headsets will be commonly bundled. We'll see more and better digital cameras built-in; they'll become standard issue on all but disposable models. More devices will have mini-thumb boards, like the new Treo 600. It saddens me to say that we'll see

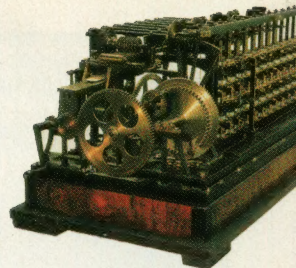
fewer slate-style devices such as today's Pocket PC Phone Edition units like my lovely Samsung i700 communicator. Most people just seem to prefer microscopic QWERTY 'boards over handwriting and gesture recognition. (I personally can't stand them and will resist using them for as long as possible. This is ten years of continuous recalcitrance; I can write in Graffiti or Microsoft's Block Recognizer faster and more accurately than I can type.) As a consequence, I expect to see touchscreens gradually fade away, replaced by RIM BlackBerry-style scroll wheel/buttons. One-handed operation will rule the day, so the vestigial stylus must go.

Look for the emergence of always-on data connectivity, allowing push e-mail delivery and news delivered to you in real-time. Today's SMS is an addictive technology, once you get into it; imagine all your information flowing in this interactive fashion. Combined with the accelerated wireless data rates on the near horizon, our entire communications experience will change fundamentally. Remember the first time you logged your WiFi-equipped notebook into a broadband connection, that rush of power and freedom? Imagine having that everywhere you go, but on a small screen.

Most importantly, these near-future devices will have far better software interfaces to tie all their functions together. Today, we are on the outside looking in at a bewildering Chinese menu of functions. Tomorrow's successful interfaces will make us feel as though we are inside, our intentions surrounded by contextually relevant choices that can be effortlessly selected.

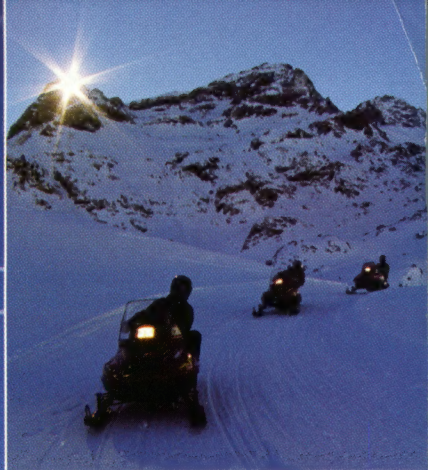
Mobile phones have taken over the world because people love to talk. We love computers because they make us smarter, yes, but mostly because there are people in them. Combine such undeniable attractions into a cool looking, reliable, moderately priced communicator and you have unleashed not merely a hit product category but an unstoppable cultural phenomenon that will define the way we live in the early 21st century.

— David MacNeill, editor-at-large
(davidmacneill@mac.com)



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